CARLING APARTMENTS
1940 CARLING AVENUE
OTTAWA, ONTARIO

TIA - STRATEGY DOCUMENT

February 18, 2022

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Consulting Transportation Engineers
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Prepared for:

2704183 Ontario Ltd.

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INTRODUCTION

The Carling Apartments will be situated on a parcel of land at 1940 Carling Avenue. The site is currently occupied by a single-family home which will be replaced by 64 rental apartments. The apartment building will have one access from an underground parking garage to Carling Avenue with completion expected by 2024.

The Transportation Impact Assessment (TIA) report will be examining the operation of the apartment building access and connecting road segments and intersections in close proximity to the site. The study will follow the City of Ottawa document, *Transportation Impact Assessment Guidelines (2017)*. Exhibit 1.1 in the Appendix presents the consultants Certification Form.

STEP 1 - SCREENING

A Screening Form has been prepared which is included as Exhibit 1.2 in the Appendix. The Screening Form has satisfied the Location Trigger which required the study to proceed to the Scoping Document stage of the Transportation Impact Assessment (TIA). The following will address the requirements of the Scoping Document.

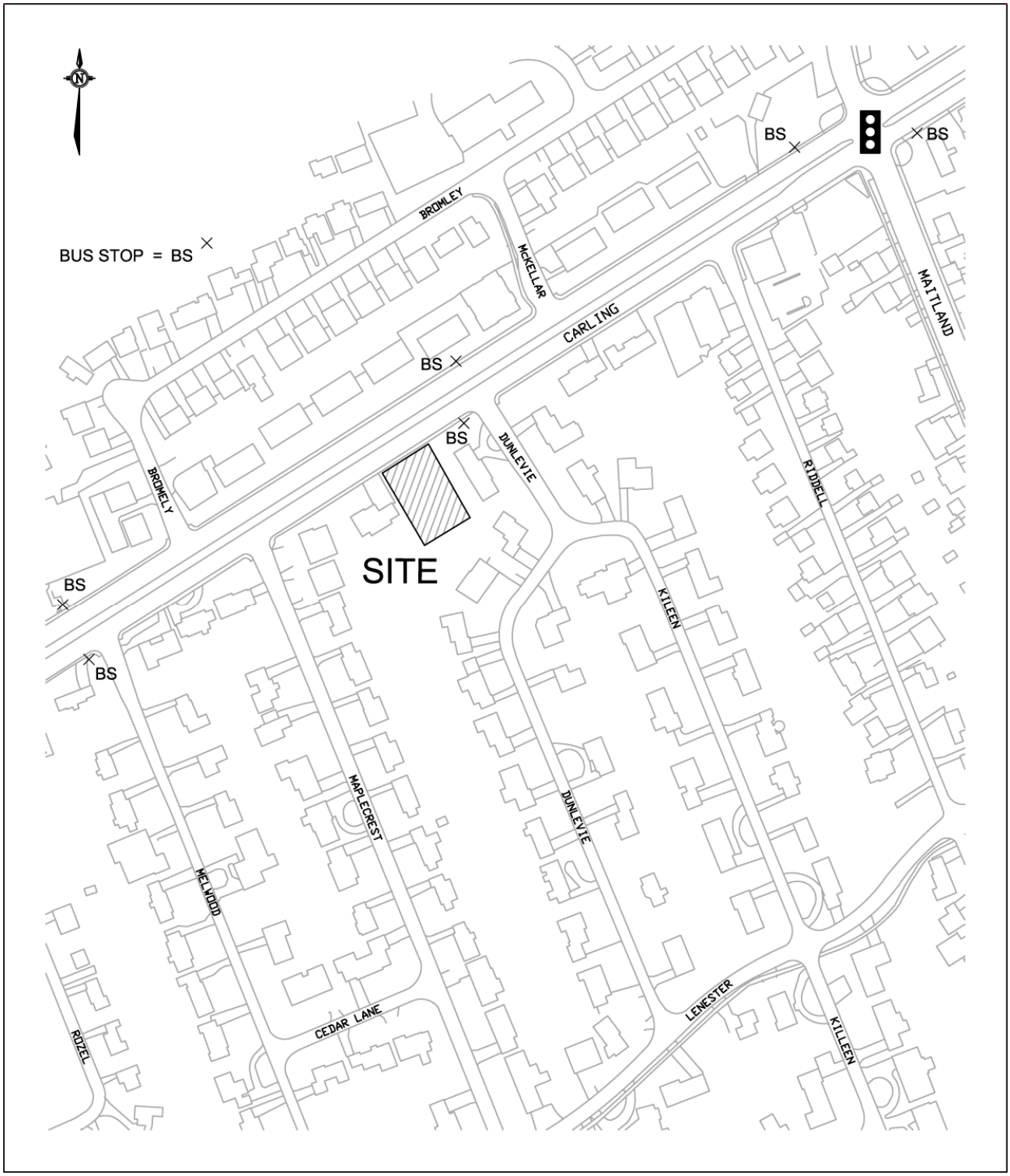
STEP 2 - SCOPING

MODULE 2.1 – Existing and Planned Conditions

Element 2.1.1 – Proposed Development

The proposed apartment development is located at 1940 Carling Avenue in the City of Ottawa. The site is situated on the south side of Carling Avenue approximately 555 m east of the intersection of Iroquois Road and Carling Avenue, and 315 m west of the intersection of Maitland Avenue and Carling Avenue. The development will consist of 64 rental apartments in a seven storey building on a 1,451.03 m^2 parcel of land. The site is currently occupied by one single-family home with the land designated as AM10[2118] H(20) “Arterial Mainstreet Zone” which will support the apartment development. Figure 2.1 provides a site location plan of the development.

FIGURE 2.1
SITE LOCATION PLAN



NOT TO SCALE

The apartment building will have one access onto Carling Avenue which will provide access to the underground parking garage containing a total of 32 parking spaces including 6 visitor parking spaces (3 surface and 3 within the parking garage). The parking provided does meets the City of Ottawa By-law requirement of 31 parking spaces.

Bicycle parking will be provided in a secured bike storage room in the underground parking garage. The storage room will provide storage for 57 bicycles along with an outside bike rack close to the entrance to the building for visitors. The By-law requires the apartment development to provide parking for 32 bicycles.

The apartment development is expected to be completed and substantially occupied by the year 2024. Figure 2.2 provides a conceptual site plan of the total development.

Element 2.1.2 – Existing Conditions

The site is currently occupied by one single-family house with two site access points onto Carling Avenue. Both accesses are restricted to right-in/right-out turning movements due to the existing centre median along Carling Avenue.

The following will describe the major road segments and intersections within the study area.

CARLING AVENUE

Carling Avenue is a six lane road under the jurisdiction of the City of Ottawa. The City of Ottawa Transportation Master Plan (TMP) has identified Carling Avenue as an arterial road and a Spine Route in the cycling network. There are no dedicated cycling lanes along the road.

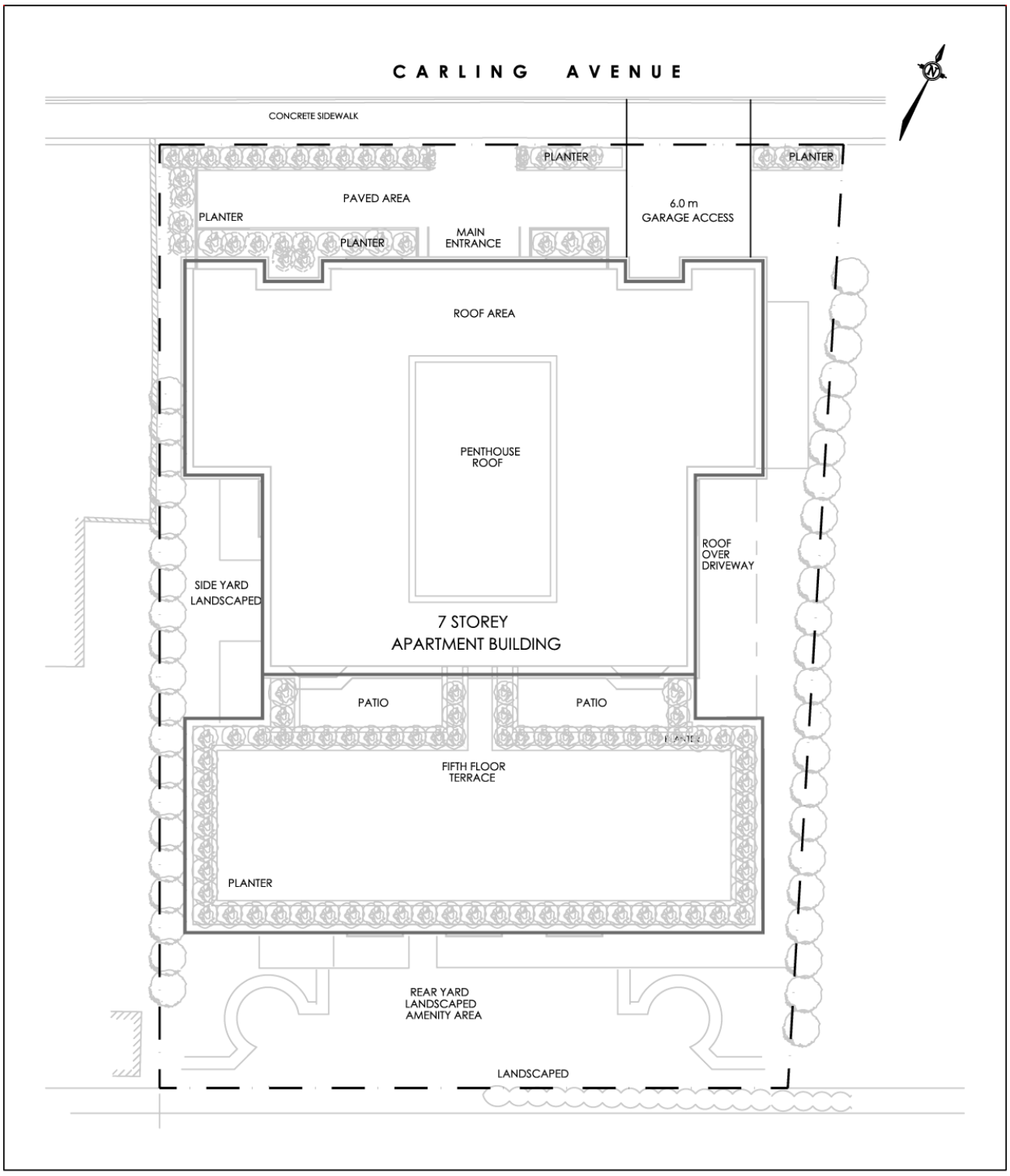
The road has an urban cross section with 1.8 m wide sidewalks along both sides of the road adjacent to the curb. The posted speed limit is 60 km/h in the vicinity of the site.

STREETS WITHIN THE STUDY AREA

Maitland Avenue located 315 m east of the site is designated in the TMP as an arterial road and Sherbourne Road a major collector road. Iroquois Road 555 m west and Hare Avenue 345 m west of the site are both designated as local streets.

Local streets and driveways along the south side of Carling Avenue in close proximity to the site would be Dunlevie Avenue locate 43 m east of the site, Maplecrest Avenue located 106 m west of the site, and a private driveway to the adjacent single-family home located 31 m west of the site. Due to the continuous centre median along Carling Avenue, all intersections have turning movements restricted to right-in/right-out.

FIGURE 2.2
CONCEPTUAL SITE PLAN



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INTERSECTION OF CARLING AVENUE AND MAITLAND AVENUE

The Carling/Maitland intersection is a signalized intersection with Carling Avenue forming the eastbound and westbound approaches, Maitland Avenue the northbound approach, and Sherbourne Road the southbound approach. The intersection is located 315 m east of the site. Below is the existing lane configuration to the intersection:

Northbound Maitland Avenue	One left turn lane (70 m storage) One shared through/right lane
Southbound Sherbourne Road	One left turn lane (40 m storage) One shared through/right lane
Eastbound Carling Avenue	One left turn lane (51 m storage) Two through lanes One shared through/right lane
Westbound Carling Avenue	Two left turn lanes (105 m storage each) One through lane One shared through/right lane

An aerial photograph of the Carling/Maitland intersection showing the intersection geometry is provided below.

INTERSECTION OF CARLING AVENUE AND MAITLAND AVENUE

INTERSECTION OF CARLING AVENUE AND IROQUOIS ROAD

The intersection of Carling Avenue and Iroquois Road is controlled by traffic signals with Carling Avenue forming the eastbound and westbound approaches, and Iroquois Road the northbound and southbound approaches. The intersection is located 555 m west of the site. The Carling/Iroquois intersection has two traffic islands for the eastbound and westbound Carling Avenue channelized right turn movements. Below is the existing lane configuration to the Carling/Iroquois intersection:

Northbound Iroquois Road	One shared left/through/right lane
Southbound Iroquois Road	One left turn lane (80 m storage)
	One shared through/right lane
Eastbound Carling Avenue	One left turn lane (25 m storage)
	Three through lanes
	One channelized right turn lane
Westbound Carling Avenue	One left turn lane (25 m storage)
	Three through lanes
	One channelized right turn lane

The westbound Carling Avenue channelized right turn lane becomes a bus priority lane from the termination of the right turn lane at the island to the stop bar at the intersection.

The intersection lane geometry is provided below in an aerial photograph.

INTERSECTION OF CARLING AVENUE AND IROQUOIS ROAD

INTERSECTION OF CARLING AVENUE AND HARE AVENUE

The intersection of Carling Avenue and Hare Avenue is a minor intersection which is located 345 m west of the site. Hare Avenue is designated in the City of Ottawa TMP as a local street. The intersection is a "T" intersection with Carling Avenue forming the eastbound and westbound approaches and Hare Avenue the northbound approach. The intersection is a two-way stop controlled intersection with a stop sign at the northbound Hare Avenue approach. Below is the existing lane configuration to the Carling/Hare intersection:

Northbound Hare Avenue	One shared left/right turn lane
Eastbound Carling Avenue	Two through lanes
	One shared through/right lane
Westbound Carling Avenue	One left turn lane (25 m storage)
	Three through lanes

An aerial photograph of the Carling/Hare intersection showing the intersection geometry is provided below.

INTERSECTION OF CARLING AVENUE AND HARE AVENUE

The most recent traffic counts were obtained from the City of Ottawa for the Carling/Iroquois and Carling/Maitland intersections with Figure 2.3 showing the peak AM and PM hour intersection counts. The counts are provided in the Appendix as

FIGURE 2.3
2017 PEAK AM AND PM HOUR TRAFFIC COUNTS

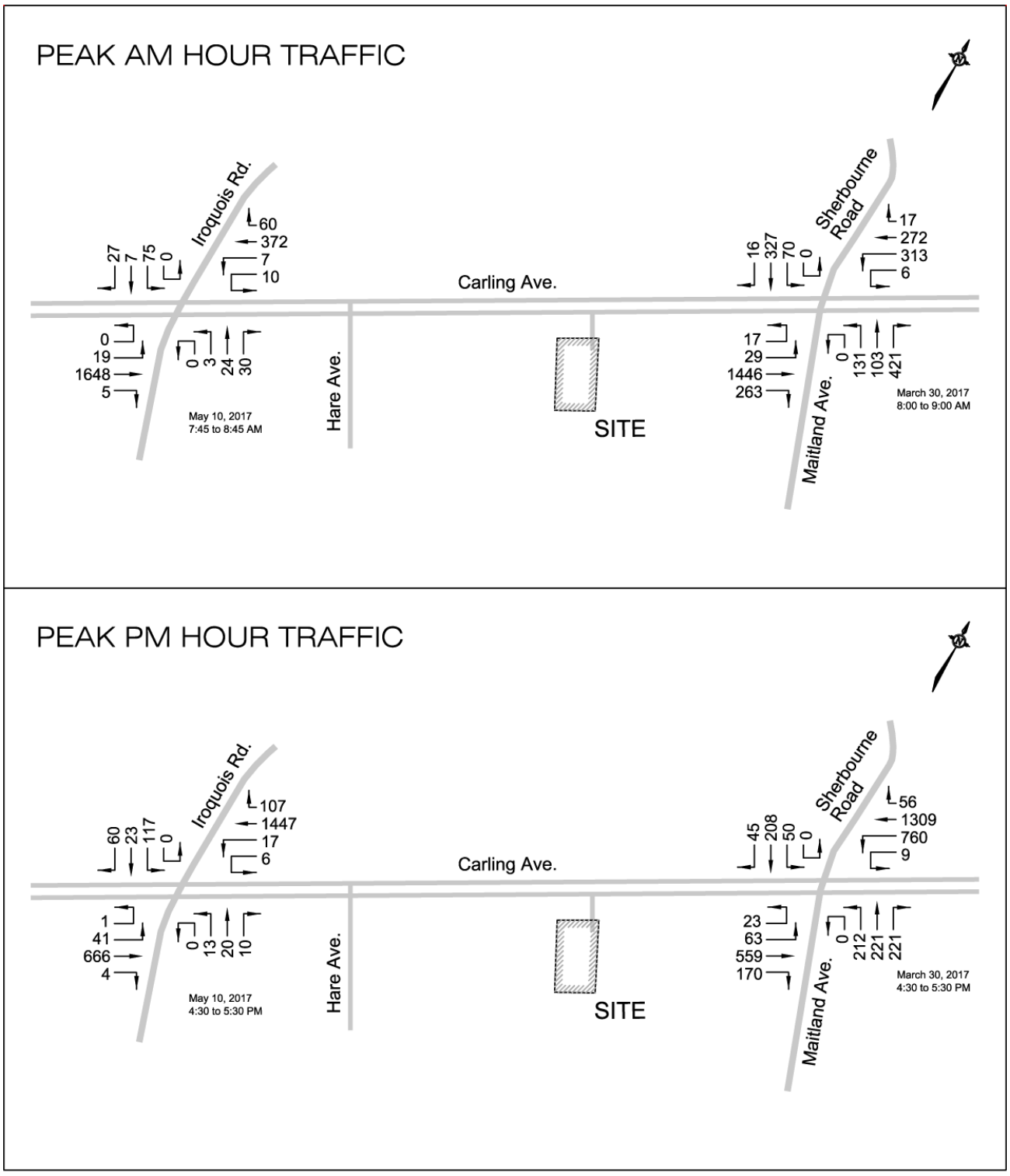


Exhibit 2.1 for the May 10, 2017 traffic counts at the Carling/Iroquois intersection and Exhibit 2.2 for the March 30, 2017 traffic counts at the Carling/Maitland (Sherbourne) intersection.

TRANSIT

The site is serviced by OC Transpo Frequent Route 85 which travels along Carling Avenue past the site with bus stops located 45 m east of the site for eastbound travel, and on the north side of Carling Avenue 50 m east of the site for westbound travel. Route 85 provides 15 minute service during peak hours with service between the Pimisi Transit Station and Bayshore Shopping Centre with a stop at the Carlingwood Shopping Centre.

Local Route 153 is a local bus route providing 7 day a week service. The nearest bus stop is located at a 720 m distance in the Carlingwood Shopping Centre. Route 153 provides 120 minute peak hour bus service with service to Tunney's Pasture.

The Route 85 and Route 153 maps are provided in the Appendix as Exhibit 2.3 with the location of the bus stops shown in Figure 2.1 (Site Location Plan).

COLLISION HISTORY

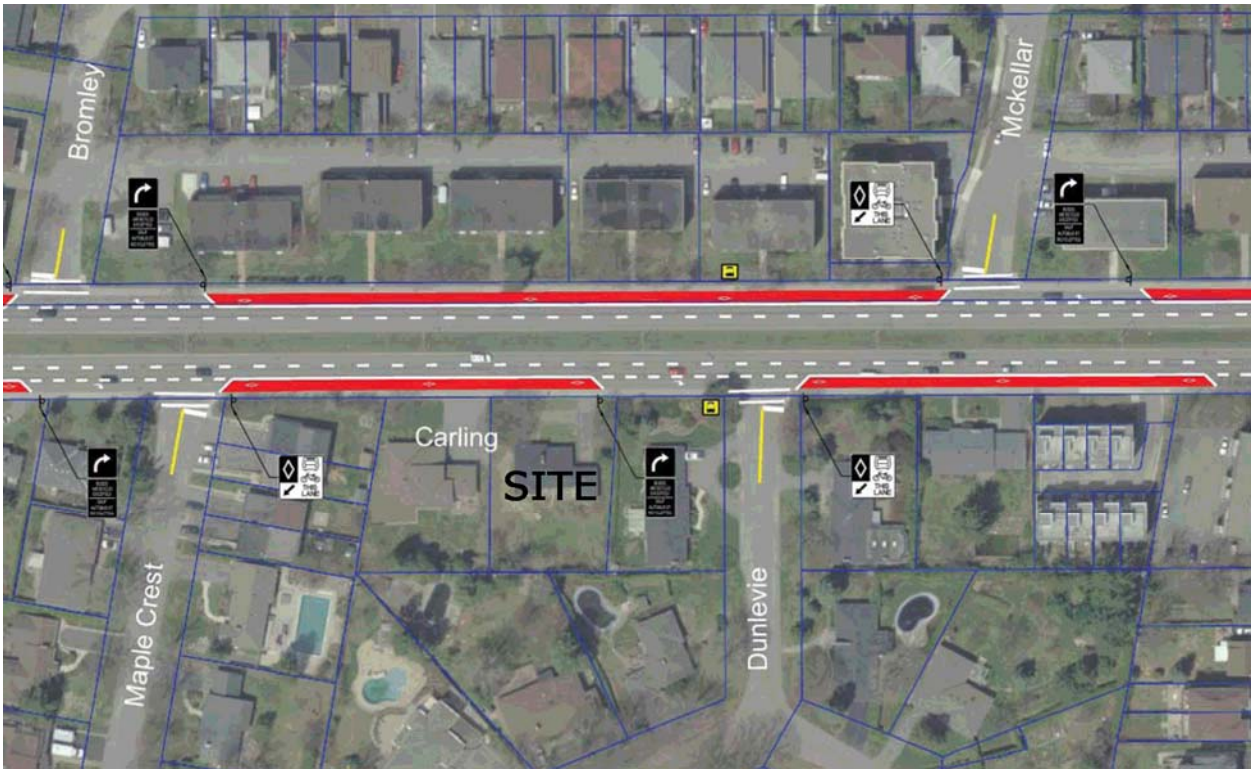
Collision reports were obtained from the City of Ottawa through Open Data Ottawa for the five year time period between the years January 1, 2015 and December 31, 2019. The collision reports were for the Carling/Iroquois and Carling/Maitland intersections. Reported collisions were also obtained for the Carling Avenue road segment between Maitland Avenue and Iroquois Road. Exhibit 2.4 in the Appendix summarizes the collisions by year and type.

Element 2.1.3 – Planned Conditions

The *Transportation Master Plan 2013* (TMP) was examined to determine if there were any road or transit projects identified within the road network of the surrounding area.

The TMP did not identify any road modifications projects in the Affordable Network Plan for the surrounding area.

The Transit Priority Projects identified under the 2031 Affordable Network in the TMP are exclusive bus lanes and transit signal priority between the Lincoln Fields Transit Station and the Carling Avenue O-Train Station. The bus priority lane would be an exclusive lane shared by buses and bicycles. The Transit Priority Corridor past the site would be provided by the conversion of an existing traffic lane to an exclusive bus lane. Some transit signal priority measures already exist along the corridor. Below is a plan showing the proposed bus lanes in the vicinity of the site.



The following are significant developments proposed within one kilometre of the site:

- A 210 unit apartment building is proposed at 1995 Carling Avenue approximately 150 m west of the site. The building would be located at the northwest corner of Carling Avenue and Bromley Road. The building is expected to be completed and occupied by the end of the year 2024.
- An apartment development located at 485 Ancaster Avenue, approximately one kilometre west of the site. The development will contain 290 apartment units in two buildings. Full occupancy is expected by 2022.
- Sears at Carlingwood Shopping Centre closed in January 2018, and will be replaced with a Canadian Tire store which is expected to open in 2022. The Canadian Tire store will relocate from its current location at Carling/Clyde.

MODULE 2.2 – Study Area and Time Periods

Element 2.2.1 – Study Area

The study area for the residential apartment development was determined to be confined to the site access onto Carling Avenue, and the major signalized intersections of Carling/Iroquois located 555 m west of the site and Carling/Maitland located 315 m east of the site.

The study will examine the intersection geometry and Carling Avenue roadway segment in accordance with the *Transportation Impact Assessment Guidelines (2017).*

Element 2.2.2 – Time Periods

The time period for the analysis would be the weekday peak AM and PM time period of traffic which would occur during the peak hour of the apartment development and the adjacent street traffic when drivers are travelling to and from work.

Element 2.2.3 – Horizon Years

The TIA will address the impact of the site generated trips from the proposed residential apartment building at 1940 Carling Avenue. The horizon year of the study will be the total completion of the development at the year 2024. The analysis will further examine the impact at the year 2029 which is five years beyond completion.

MODULE 2.3 – Exemptions Review

The exemptions, which provide possible reductions to the scope of work of the TIA Study, were examined using Table 4: Possible Exemptions which is provided in the City's *Transportation Impact Assessment Guidelines (2017).* Utilizing the table, the following lists the possible exemptions proposed for the TIA Study report:

MODULE	ELEMENT	EXEMPTION CONSIDERATIONS
Design Review Component		
4.1 Development Design	4.1.2 Circulation and Access	**Required** – The access onto Carling Avenue will be examined along with the circulation of traffic within the site.
	4.1.3 New Street Networks	**Not Required** - Only required for subdivisions.
4.2 Parking	4.2.1 Parking Supply	**Required** – The parking supply will be examined with the supply of parking compared to that required as determined from City By-laws.
	4.2.2 Spillover Parking	**Not Required** - Parking will meet the City of Ottawa By-laws.
Network Impact Component		
4.5 Transportation Demand Management	All Elements	**Required** – TDM measures will be examined.
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	**Not Required** – The site will have access onto an arterial road and would not exceed ATM capacity thresholds.
4.8 Network Concept		**Not Required** - The site would not generate more than 200 person-trips per peak hour in excess of the volume permitted by established zoning.

STEP 3 - FORECASTING

MODULE 3.1 - Development-generated Travel Demand

Element 3.1.1 – Trip Generation and Mode Shares

The Carling Apartments will comprise of 64 rental apartment units in a 7 storey apartment building. The number of expected site generated trips was determined utilizing the trip statistical data and procedure documented in the *TRANS Trip Generation Manual, Summary Report October 2020*. The analysis used the Person-Trip Generation Rates from Table 3 of the TRANS document for the ITE Land Use Code 221 & 222, "Multi-Unit (High-Rise)". Peak period person-trips would occur between 7:00 AM and 9:30 AM, and between 3:30 PM and 6:00 PM.

The TRANS document has divided the Ottawa-Gatineau area into 26 districts. The Carling Apartments development is located within the Ottawa West district which is depicted in Figure 1 of the document. The Ottawa West district data was used in the determination of the mode share.

Staff of the City of Ottawa has developed a spreadsheet that calculates the number of person-trips for each mode of transportation. Table 3.1 shows the peak AM and PM hour person-trips.

TABLE 3.1
MODE SHARE SPREADSHEET (Peak AM and PM Hour Person-Trips)

Time	Number of Units	Type of Unit	District		AM peak			PM peak			AM peak	PM peak
Peak Hour	64	High-Rise	Ottawa West		In	Out	Total	In	Out	Total	Mode Share	Mode Share
				Auto Driver	2	5	7	5	3	8	26%	31%
				Auto Passenger	1	2	3	2	1	3	10%	10%
				Transit	4	8	12	4	3	7	43%	26%
				Cycling	0	1	1	1	1	2	3%	7%
				Pedestrian	1	3	5	4	3	7	18%	26%
				Total	8	19	27	16	11	27	100%	100%

The TIA Guidelines allow for three Trip Reduction Factors. The three trip reductions would consist of trips from existing development on site, pass-by trips, and shared trips within the site between two or more uses. No trip reduction factors were applied for the following reasons:

1. The site currently has only one single-family home on site which would generate little peak hour traffic.
2. The residential use would generate all primary trips with no pass-by trips.
3. The residential rental apartment land use would be a single use with no shared trips between other uses on site.

Element 3.1.2 – Trip Distribution

The distribution of expected site generated trips onto the adjacent roads was determined from the examination of the 2017 peak hour traffic counts at the Carling/Iroquois and Carling/Maitland intersections which would show the traffic patterns in the area. These volumes would represent the weekday peak AM and PM hour commuter trips to/from the apartment building. The determination of trips also considered the shortest and most convenient routes to employment and retail areas along the road network. The site generated trips were distributed onto the adjacent roads to the following proportion:

To/From the West along Carling	30%		
To/From the East along Carling	70% →	To/From the North along Sherbourne	5%
		To/From the South along Maitland	10%
		To/From the East along Carling	55%

Note: The Site access is by right-in/right-out turning movements due to the median along Carling Avenue. Traffic would make legal "U" turns at Maitland Avenue and Hare Avenue in order to enter and exit the site to/from all directions.

Element 3.1.3 – Trip Assignment

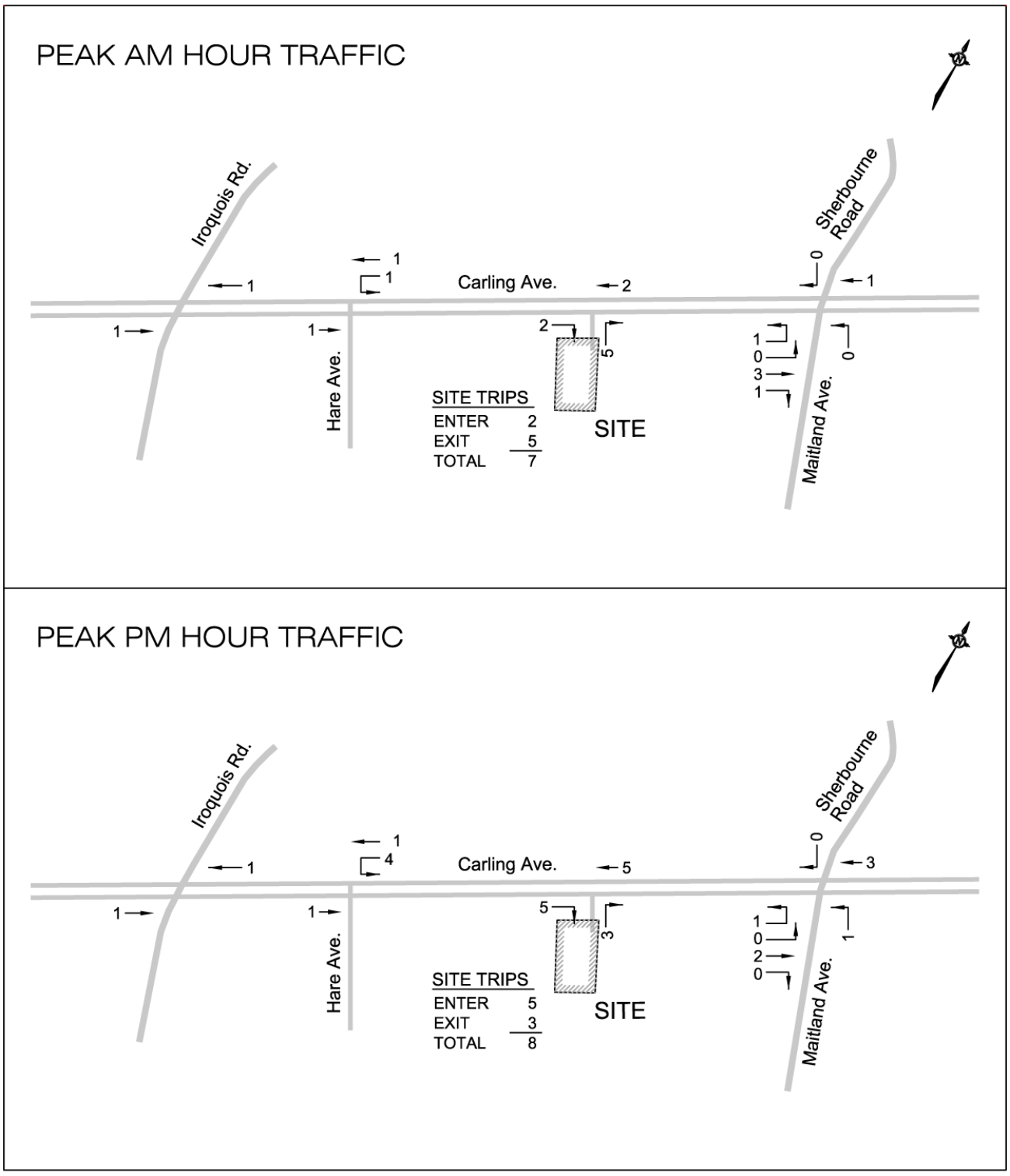
The distribution of site generated vehicle-trips was determined by applying the directional distribution of trips entering and exiting the site to all modes for the peak AM and PM hour person-trips as shown in Table 3.1, Mode Share Spreadsheet. It is assumed that one Auto Driver trip equals one vehicle-trip. Table 3.2 presents the peak hour distribution of vehicle-trips entering and exiting the site.

TABLE 3.2
PEAK HOUR DISTRIBUTION OF VEHICLE-TRIPS

PEAK HOUR TRIPS / BUILDING USE	WEEKDAY PEAK AM HR.			WEEKDAY PEAK PM HR.		
	TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
64 Apartment Units	7	2 (31%)	5 (69%)	8	5 (58%)	3 (42%)

The trip distribution, as discussed in Element 3.1.2, was applied to the peak AM and PM peak hour vehicle-trips shown in Table 3.2. Figure 3.1 presents the peak AM and PM hour residential trips to/from the site.

FIGURE 3.1
PEAK AM AND PM HOUR SITE GENERATED TRIPS



MODULE 3.2 - Background Network Travel Demands

Element 3.2.1 – Transportation Network Plans

The City of Ottawa *Transportation Master Plan (TMP) 2013* was reviewed to identify transit and roadway projects in the vicinity of the development. The proposed changes to the transportation network are identified in this report under Element 2.1.3 - Planned Conditions. The TMP does identify under the 2031 Affordable Projects the construction of an exclusive lane for buses and bicycles past the site which would be constructed between the Lincoln Fields Transit Station and the Carling O-Train Station. The exclusive bus priority lane along with transit signal priority would improve transit service.

Element 3.2.2 – Background Growth

The growth in background traffic along Carling Avenue was determined by the examination of historical traffic volumes for various modes of travel. The trip trend of trips to/from the Ottawa West area for auto driver trips was examined in the *National Capital Region Travel Trends* document prepared by the IBI Group. The document showed that the auto driver trip trend from the Ottawa West area has decreased at an annual compounded rate of -2.29 percent for the AM peak period between the years of 2005 and 2011.

The study has also reviewed other traffic studies for development in the area which determined the growth in background traffic from historical traffic counts and travel trends. The studies found that traffic along Carling Avenue has decreased over the recent years and the studies have utilized an annual average compounded growth rate of between -0.05 and 0.00 percent.

In keeping with the auto driver growth trend and studies for other area developments, the TIA analysis has assumed a 0.00 percent increase in background traffic from development outside the study area.

Element 3.2.3 – Other Developments

Other development in the area which would contribute to the increase in background traffic is the following:

- The IBI Group has prepared a TIA report for a 210 unit apartment building at 1995 Carling Avenue approximately 150 m west of the site. The building would be located at the northwest corner of Carling Avenue and Bromley Road. The building is expected to be completed and occupied by the end of the year 2024.
- Novatech has prepared a TIA report for an apartment development located at 485 Ancaster Avenue, approximately one kilometre west of the site. The development will contain 290 apartment units in two buildings. Full occupancy is expected by 2022.

- The Sears store at Carlingwood Shopping Centre closed in January 2018, and will be replaced with a Canadian Tire store which is expected to open in 2022. The Canadian Tire store will relocate from its current location at Carling/Clyde.

The Carling Apartments TIA has included the expected site generated trips as documented in the TIA studies for both the 1995 Carling Avenue and 485 Ancaster residential developments in the expected 2024 and 2029 background traffic. It is assumed that the new site trips from the proposed Canadian Tire store at Carlingwood Shopping Centre would be approximately equal to the trips from the Sears store which it replaced. With the Sears store site trips included in the 2017 traffic counts obtained from the City of Ottawa, no additional trips from the proposed Canadian Tire store were accounted for in the background traffic.

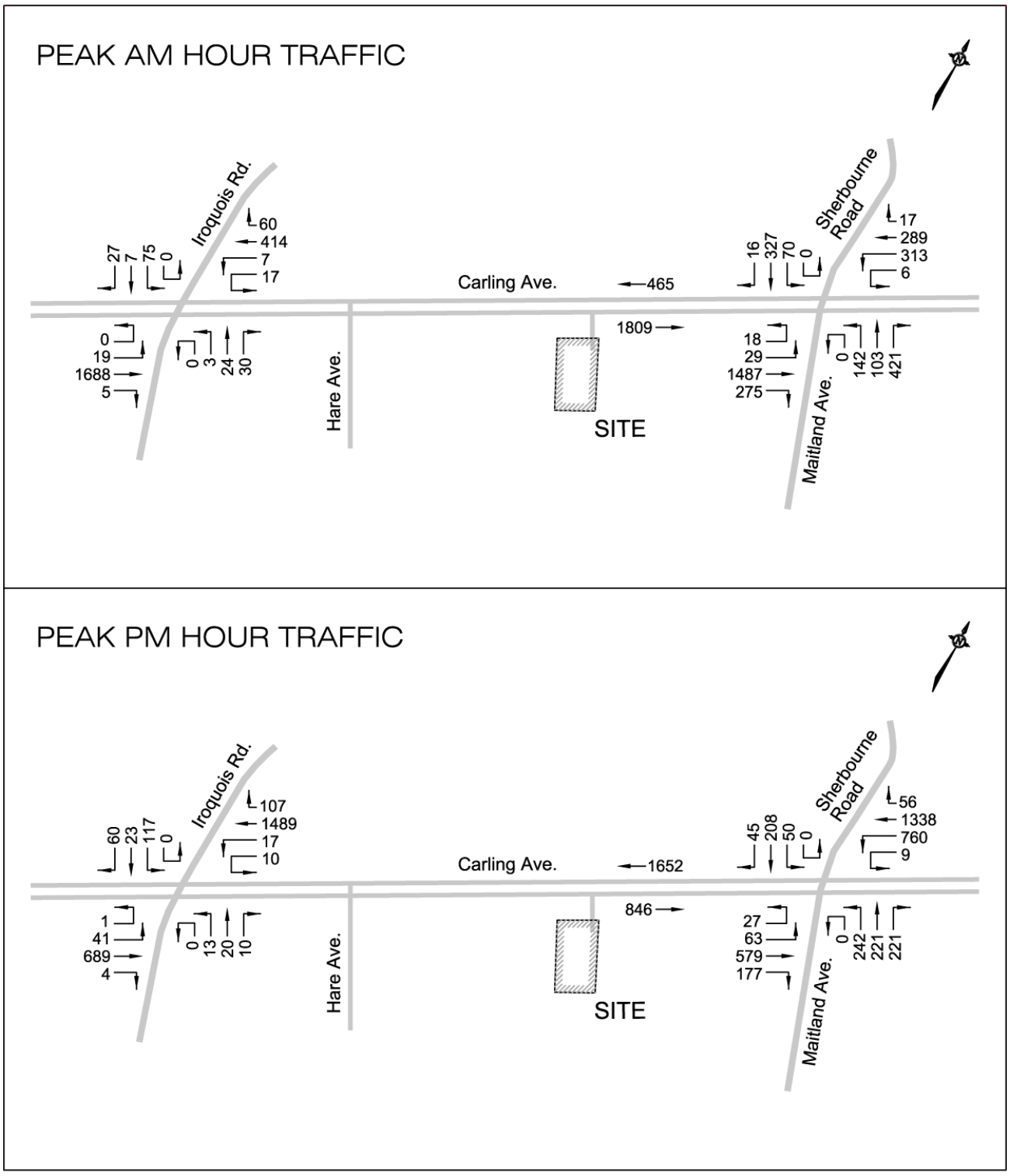
Figure 3.2 presents the 2024 peak AM and PM peak hour background vehicle traffic (does not include trips from the proposed apartment development). Figure 3.3 shows the expected 2029 peak hour background traffic which represents five years beyond completion of the development.

MODULE 3.3 - Demand Rationalization

The City of Ottawa has identified a Transit Priority Corridor under the 2031 Affordable Network in the TMP which would reduce the automobile travel lanes along Carling Avenue by one lane in each direction between the Lincoln Fields Transit Station and the Carling Avenue O-Train Station. The lane would be replaced with an exclusive bus/cycling lane. The bus lane would increase transit ridership which would be further improved with the completion of the LRT lines. This would allow the elimination of one automobile travel lane in each direction and result in a reduction in future traffic along Carling Avenue past the site.

The total vehicular traffic is the sum of the peak hour site generated trips and the peak hour background traffic. The site generated trips would be the addition of the apartment trips from Figure 3.1, and the background traffic (Figure 3.2 for the year 2024 and Figure 3.3 for the year 2029). Figure 3.4 presents the total 2024 peak hour vehicular traffic and Figure 3.5 the total 2029 peak hour vehicular traffic.

FIGURE 3.2
2024 PEAK AM AND PM HOUR BACKGROUND TRAFFIC



NOT TO SCALE

FIGURE 3.3
2029 PEAK AM AND PM HOUR BACKGROUND TRAFFIC

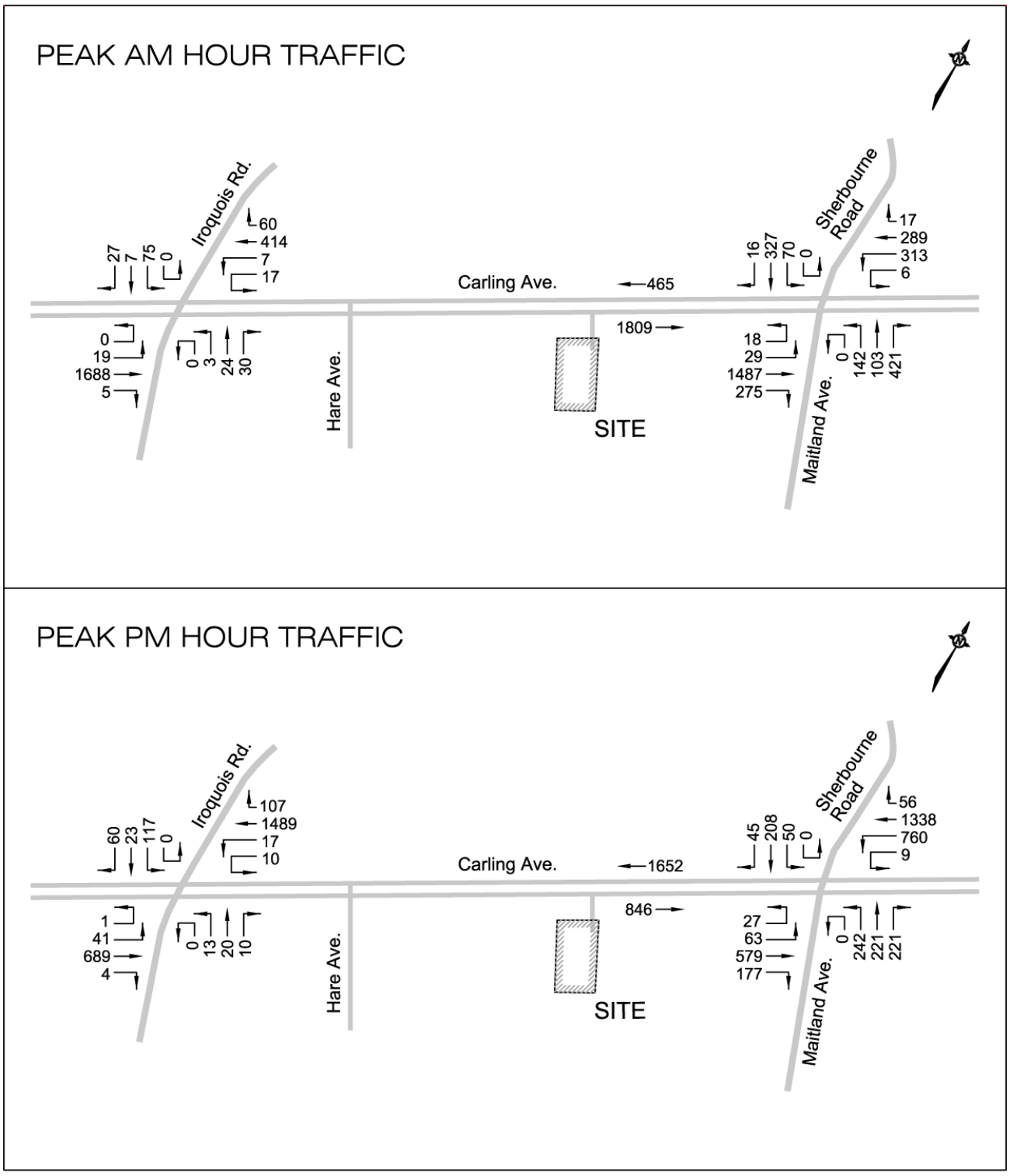


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FIGURE 3.4
2024 PEAK AM AND PM HOUR TOTAL TRAFFIC

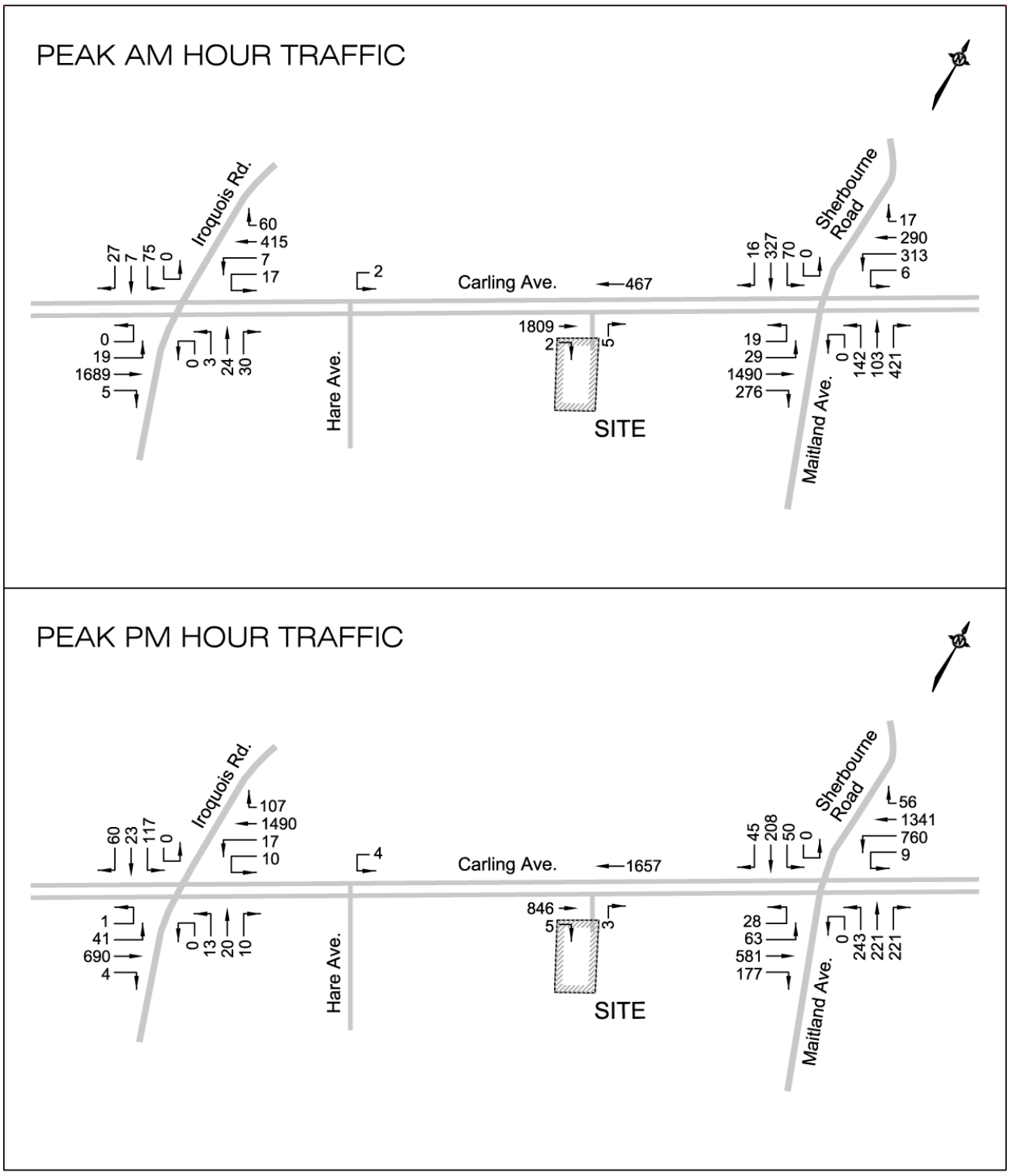
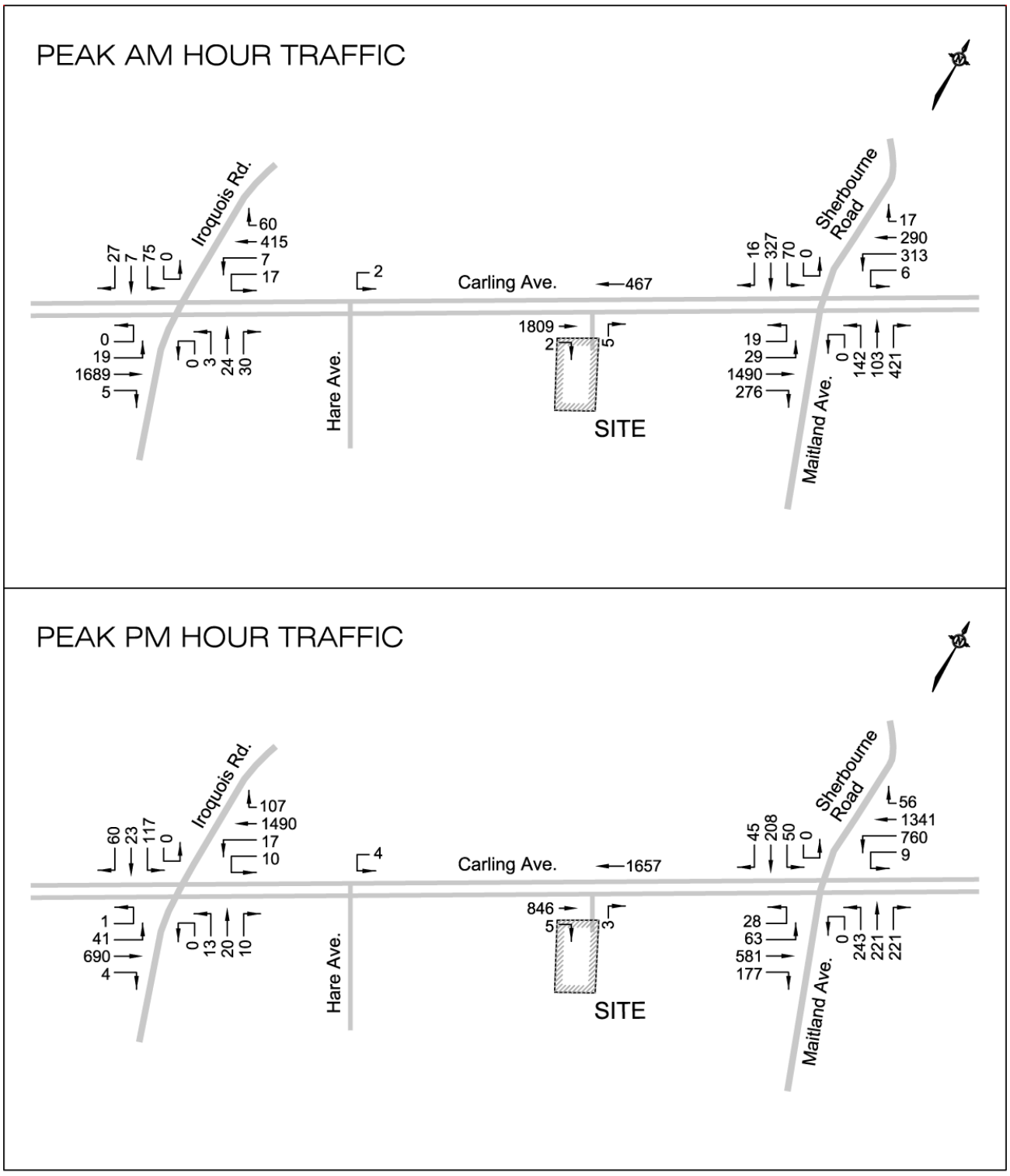


FIGURE 3.5
2029 PEAK AM AND PM HOUR TOTAL TRAFFIC



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STEP 4 – ANALYSIS

MODULE 4.1 – Development Design

Element 4.1.1 – Design for Sustainable Modes

The Carling Apartments are located along Carling Avenue with all vehicular and bicycle parking contained on-site. The apartment building will contain 32 vehicular parking spaces and storage for 57 bicycles. The number of vehicle parking spaces and bicycle storage meets the City of Ottawa By-law.

Carling Avenue has pedestrian sidewalks along both the north and south sides of the road. Bus stops for Frequent Route 85 are located within a 400 m walk from the apartment building adjacent to and across the road from the site. Route 85 provides 15 minute peak time period service with service to the Bayshore Transit Station to the west, and the Pimisi LRT station and the downtown core to the east. The bus stop locations are shown in Figure 2.1.

The study has utilized the *TDM - Supportive Development Design and Infrastructure Checklist* for Residential Developments which is provided below. The checklist examines the opportunity to implement facilities which are supportive of sustainable modes.

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☒ The building is located adjacent to the street with parking provided in an underground garage
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☒ The entrances are located at the front of the building
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☒ OC Transpo bus stops are in close proximity to the site at a walk distance of approximately 135 m
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☒ The main building entrance is located adjacent to the public sidewalk

TDM-supportive design & infrastructure measures: *Residential developments*			Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☒
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☒
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☒ Carling Avenue is designated as a Spine Route in the TMP. Bicycles can have access to Carling Avenue through the entrance to the underground parking garage
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☒ The building entrances are close to the public sidewalk
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

	TDM-supportive design & infrastructure measures: *Residential developments*		Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☒ There is a secured bicycle storage room in the underground parking garage
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☒ The development will provide bicycle parking spaces in the garage with a bike rack at building entrances
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☒
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☒ The number of bike storage spaces exceed City By-laws
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☒ Bike parking and storage will be provided in a secured room in the underground parking garage
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ N/A
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐ N/A
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ N/A

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☒ The site provides 32 parking spaces which is approximately equal to the City By-law
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐ N/A
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐

Element 4.1.2 – Circulation and Access

The site will have a 6.0 m wide entrance/exit to the underground parking garage. The Site Plan provides three surface parking spaces along the entrance to the garage which can be used for short term parking of small delivery vehicles. The spaces would be outside the secured parking garage.

Large moving trucks (tractor semi-trailer) would be temporarily parked along the outside lane of Carling Avenue with close access to the front door of the building. Following the completion of the Transit Priority Project along Carling Avenue, the large trucks would be temporarily parked in the bus/cycling lane adjacent to the curb at the front entrance to the building.

Garbage containers would be stored in the garbage room on the ground floor of the building. For the emptying of containers, the containers would be moved to the driveway entrance to the garage where a garbage truck would enter, empty the containers, then back out onto Carling Avenue and continue travelling east.

Element 4.1.3 – New Street Networks

Exempt as determined in the Scoping Document.

MODULE 4.2 – Parking

Element 4.2.1 – Parking Supply

The Carling Apartment site will be providing 32 vehicular parking spaces, 29 in a secured underground parking garage and 3 surface parking spaces outside the garage. The development meets the City of Ottawa parking By-law which requires the site to provide 31 parking spaces.

The development will provide storage in a secured room in the parking garage for 57 bicycles with an additional bike rack close to the front entrance of the building. The City By-law requires the development to provide space to store 32 bicycles.

The site is located in an area with good transit and is close to employment areas within walking distance of the apartment building. The site provides adequate bicycle and vehicular parking for the development.

Element 4.2.2 – Spillover Parking

Exempt as determined in the Scoping Document.

MODULE 4.3 – Boundary Street Design

The City of Ottawa Complete Streets concept allows for the safe movement of everyone whether they choose to walk, bike, drive, or take public transit. The boundary road to

the Carling Apartments would consist of Carling Avenue. Carling Avenue is an arterial road with a posted speed limit of 60 km./h. The existing roadway cross section in the vicinity of the site is a six lane divided road. There are sidewalks along both sides of the road. The road is designated in the TMP as a bicycle Spine Route, but there currently are no bike facilities along the road.

The TMP has identified under the 2031 Affordable Network exclusive bus lanes and transit signal priority between the Lincoln Fields Transit Station and the Carling Avenue O-Train Station. The bus priority lane would be provided by converting the outside lane in each direction to a shared bus/bicycle lane and reducing Carling Avenue to a four lane divided road.

The multi-modal level of service for the Carling Avenue street segment between Iroquois Road and Maitland Avenue was determined for the expected 2029 traffic utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. The following examined the MMLOS for the various modes of travel along the Carling Avenue street segment.

PEDESTRIAN LEVEL OF SERVICE (PLOS)

Sidewalks exist along both sides of Carling Avenue between Iroquois Road and Maitland Avenue. The sidewalks are 1.8 m in width and are located adjacent to the curb. The MMLOS analysis was conducted assuming that the bus priority lanes were completed by 2029. The MMLOS analysis determined the street segment to have a PLOS “D”. The MMLOS analysis sheet is provided in the Appendix as Exhibit 4.1,

BICYCLE LEVEL OF SERVICE (BLOS)

Carling Avenue is an arterial road designated as a Spine Route. There are currently no cycling facilities along the road. The MMLOS analysis for the 2029 traffic and roadway geometry has assumed the bus priority lanes to be constricted which will be designated for only bus and bicycle use. The MMLOS segment analysis determines the street to function at a BLOS “C” as shown in Exhibit 4.1.

TRANSIT LEVEL OF SERVICE (TLOS)

Transit bus service has Frequent Route 85 travelling along Carling Avenue with 15 minute peak hour service to major transit hubs. The bus stops are located in close proximity to the site. The MMLOS sheet for the transit mode of travel determined the street to function at a TLOS “B” assuming the bus priority lanes are constructed by the 2029 analysis year. The MMLOS street segment sheet is provided as Exhibit 4.1.

TRUCK LEVEL OF SERVICE (TkLOS)

Carling Avenue is a truck route which determined the street to function at a TkLOS “A”. The analysis sheet is provided as Exhibit 4.1.

Traffic collisions along the Carling Avenue street segment between Iroquois Road and Maitland Avenue are discussed in Element 2.1.2 with the collision summary provided in a table as Exhibit 2.4. Over the five year period between January 1, 2015 and December 31, 2019, 26 collisions were recorded along the Carling Avenue road segment. Of the 26 collisions, 8 were labeled rear end collisions and 5 were sideswipe collisions. The pattern of collisions did not identify any measures which could be taken to reduce the number of collisions.

The Carling Avenue road segment between Iroquois Road and Maitland Avenue was analyzed to determine the level of service which was compared to the MMLOS targets for pedestrians, bicycles, and transit. The calculated Level of Service (LOS) was determined using the Multi-Modal Level of Service Worksheet provided as Exhibit 4.1 in the Appendix. The LOS targets were obtained from Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines* for an Arterial Mainstreet as designated in the Official Plan - Urban Policy Plan. Table 4.1 summarizes the MMLOS results for the road segments and targets.

TABLE 4.1
MULTI-MODAL (MMLOS) SEGMENT SUMMARY TABLE - Carling Ave.

STREET SEGMENT	Level of Service (LOS) – 2029				
	Pedestrian	Bicycle	Transit	Auto	Truck
Calculated (Exhibit 4.1)	D	C	B	-	A
Target	C	C	C	-	D

The pedestrian PLOS did not meet the target due to the operational speed of traffic and lack of a boulevard between the curb and the sidewalk. Lowering the posted speed limit would increase the PLOS to meet target.

MODULE 4.4 – Access Intersection Design

Element 4.4.1 – Location and Design of Access

The Carling Apartments will have one 6.0 m wide access to the underground parking garage and 3 surface parking spaces. Approximately 31 m west of the access is the driveway to the adjacent residential home, and 43 m east of the garage access is Dunlevie Avenue. There are no driveways on the north side of Carling Avenue across from the site, with Carling Avenue having a raised median between Maitland Avenue and Hare Avenue.

The closest signalized intersections to the site are the Carling/Maitland intersection which is located 315 m east of the site access, and the Carling/Iroquois intersection located 555 m west of the site access.

Element 4.4.2 – Intersection Control

The site access will function as a right-in/right-out access controlled by the centre median along Carling Avenue. The access will be controlled by an implied stop sign at the northbound exit lane from the site.

Element 4.4.3 – Intersection Design

The analysis of the Site Access/Carling, Carling/Iroquois and Carling/Maitland intersections were completed for all modes using the *Multi-Modal Level of Service (MMLOS) Guidelines* and the *Highway Capacity Manual (HCM) 2010*. Each mode will be addressed in the following sections:

VEHICLE LEVEL OF SERVICE (LOS) – Intersection Capacity Analysis

The analysis of the intersections will use the *Highway Capacity Software, Version 7.9.5,* which uses the capacity analysis procedure as documented in the *Highway Capacity Manual (HCM) 2010 and HCM 6th Edition*.

For unsignalized intersections, the level of service of each lane movement and approach is determined as a function of the average control delay of vehicles at the approach. The following relates the level of service of each lane movement with the expected control delay at the approach.

LEVEL OF SERVICE	AVERAGE CONTROL DELAY	
Level of Service A	0-10 sec./vehicle	Little or No Delay
Level of Service B	>10-15 sec./vehicle	Short Traffic Delays
Level of Service C	>15-25 sec./vehicle	Average Traffic Delays
Level of Service D	>25-35 sec./vehicle	Long Traffic Delays
Level of Service E	>35-50 sec./vehicle	Very Long Traffic Delays
Level of Service F	>50 sec./vehicle	Extreme Delays – Demand Exceeds Capacity

The expected length of queue at the critical lane movements for an unsignalized intersection was determined by the calculation of the 95th percentile queue at the lane approach as shown on the analysis work sheets provided in the Appendix. The 95th percentile queue length is the calculated 95th greatest queue length out of 100 occurrences at a movement during a 15-minute peak period. The 95th percentile queue length is a function of the capacity of a movement and the total expected traffic, with the calculated value determining the magnitude of the queue by representing the queue length as fractions of vehicles.

For a signalized intersection, the operation or level of service of an intersection is determined from the volume to capacity ratio (v/c) for each lane movement as

documented by the City of Ottawa in the *Transportation Impact Assessment Guidelines (2017)*. The following relates the level of service with the volume to capacity ratio at each lane movement.

LEVEL OF SERVICE	VOLUME TO CAPACITY RATIO
Level of Service A	0 to 0.60
Level of Service B	0.61 to 0.70
Level of Service C	0.71 to 0.80
Level of Service D	0.81 to 0.90
Level of Service E	0.91 to 1.00
Level of Service F	> 1.00

The 2024 traffic analysis for both background traffic and total traffic assumed the existing lane configuration at intersections. The 2029 operational analysis for the background and total traffic assumed that the transit priority measures are in place which comprises of an exclusive bus/cycling lane along eastbound and westbound Carling Avenue. The results of the analysis are discussed in detail in the following sections:

Site Access and Carling Avenue Intersection

The site access is a right-in/right-out "T" intersection with turning movements controlled by the median along the centre of Carling Avenue. The intersection is controlled by an implied stop sign at the northbound site exit. There are no proposed exclusive turn lanes along Carling Avenue into the site.

The operational analysis was conducted for the 2024 total traffic following the completion of the development. The analysis determined that the northbound site exit approach would function at a Level of Service (LOS) "C" during the peak AM hour and LOS "B" during the peak PM hour. The operation of the intersection is summarized in Table 4.2 with the 2024 analysis sheets provided as Exhibit 4.2 and 4.3.

TABLE 4.2
SITE ACCESS/CARLING INTERSECTION – LOS & Delay (sec/veh) / v/c

APPROACH	WEEKDAY PEAK AM HOUR Total - ***2024*** (2029)			WEEKDAY PEAK PM HOUR Total - ***2024*** (2029)		
	LOS	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**
NB Right	***C*** (C)	***22.8*** (20.2)	***0.03*** (0.02)	***B*** (B)	***13.2*** (12.0)	***0.01*** (0.01)

At the year 2029 assuming the transit priority measures have been completed and Carling Avenue past the site is reduced to four travel lanes, the access will continue to function at a LOS “C” during the peak AM hour and LOS “B” during the peak PM hour as shown in Table 4.2 with the analysis sheets provided as Exhibit 4.4 and Exhibit 4.5.

Using the 2029 volume of traffic, the 95th percentile queue at the northbound site access approach would be 0.1 vehicles (7 m) during the peak AM hour and 0.0 vehicles during the peak PM hour. The queue would not interfere with the operation of the site access to the parking garage.

The intersection would operate at an acceptable level of service following the development of the site. There would be no requirement for any intersection modifications at the site access or along Carling Avenue due to the construction of the Carling Apartments.

Carling Avenue and Iroquois Road Intersection

The Carling/Iroquois intersection is an existing intersection controlled by traffic signals with Carling Avenue forming the eastbound and westbound approaches and Iroquois Road the northbound and southbound approaches.

The operational analysis for the existing 2017 traffic counts determined the intersection to operate at a LOS “A” during both the peak AM and PM hours as shown in Table 4.3 with the analysis sheets provided as Exhibit 4.6 and Exhibit 4.7.

TABLE 4.3
CARLING/IROQUOIS INTERSECTION – LOS & v/c

APPROACH	**WEEKDAY PEAK AM HOUR** Existing - 2017 **Background - 2024** *2029* **Total - *2024*** (2029)		**WEEKDAY PEAK PM HOUR** Existing - 2017 **Background - 2024** *2029* **Total - *2024*** (2029)	
	LOS	**v/c**	**LOS**	**v/c**
EB Left	A **A** *A* ***A*** (A)	0.025 **0.026** *0.026* ***0.026*** (0.026)	A **A** *A* ***A*** (A)	0.130 **0.133** 0.133 ***0.133*** (0.133)
EB Through	A **A** *C* ***A*** (C)	0.542 **0.555** *0.795* ***0.556*** (0.795)	A **A** *A* ***A*** (A)	0.229 **0.236** 0.338 ***0.237*** (0.339)
WB Left	A **A** *A* ***A*** (A)	0.099 **0.145** *0.196* ***0.145*** (0.196)	A **A** *A* ***A*** (A)	0.052 **0.063** 0.064 ***0.063*** (0.064)
WB Through	A **A** *A* ***A*** (A)	0.143 **0.159** *0.159* ***0.160*** (0.160)	A **A** *A* ***A*** (A)	0.566 **0.582** 0.582 ***0.583*** (0.583)
NB Lt/Through/Rt	A **A** *A* ***A*** (A)	0.438 **0.438** *0.438* ***0.438*** (0.438)	A **A** *A* ***A*** (A)	0.287 **0.287** 0.287 ***0.287*** (0.287)
SB Left	A **A** *A* ***A*** (A)	0.511 **0.511** *0.511* ***0.511*** (0.511)	B **B** *B* ***B*** (B)	0.686 **0.686** 0.686 ***0.686*** (0.686)
SB Through/Rt	A **A** *A* ***A*** (A)	0.269 **0.269** *0.269* ***0.269*** (0.269)	A **A** *A* ***A*** (A)	0.550 **0.550** 0.550 ***0.550*** (0.550)
Total	A **A** *A* ***A*** (A)	0.319 **0.334** *0.387* ***0.334*** (0.435)	A **A** *A* ***A*** (A)	0.361 **0.372** 0.429 ***0.373*** (0.430)

The 2024 (existing lane configuration) and 2029 (transit priority measures) background traffic analysis determined the intersection to operate at a LOS “A” during both the peak AM and PM hours as shown in Table 4.3 and Exhibit 4.8 to Exhibit 4.11.

Following the development of the Carling Apartments, the intersection including the site generated trips would operate at a LOS “A” during the 2024 (existing lane configuration) and the 2029 (transit priority measures) peak AM and PM hour total traffic. The analysis is summarized in Table 4.3 with the analysis sheets provided as Exhibit 4.12 to Exhibit 4.15.

The Carling/Iroquois intersection would operate at an acceptable level of service following the development of the site with no adjustments to signal timing. There would be no requirement for any intersection modification due to the development of the site.

Carling Avenue and Maitland Avenue Intersection

The Carling/Maitland intersection is a signalized intersection located 315 m east of the site. Carling Avenue forms the eastbound and westbound approaches, Maitland Avenue the northbound approach, and Sherbourne Road the southbound approach.

The operational analysis was conducted for the existing 2017 traffic counts which determined the intersection would operate at a LOS “B” during the peak AM hour and a LOS ”C” during the peak PM hour. Table 4.4 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 4.16 to Exhibit 4.17.

The 2024 background traffic operational analysis was conducted for the existing lane configuration which determined the intersection to operate at a LOS “B” during the peak AM hour and LOS “C” during the peak PM hour. For the 2029 traffic with transit priority measures, the intersection would operate at a LOS “A” during the peak AM hour and LOS “C” during the peak PM hour. The analysis is summarized in Table 4.4 and the analysis sheets of Exhibit 18 and Exhibit 21.

The intersection, using the total traffic which includes the site trips, would operate at a LOS “A” during the peak AM hour and LOS “C” during the peak PM hour for both the years 2024 (existing lane configuration) and 2029 (transit priority measures). The operation is summarized in Table 4.4 with the analysis sheets provided as Exhibit 22 to Exhibit 25.

The Carling/Maitland intersection would operate at an acceptable level of service following the development of the site with some slight adjustments to traffic signal timing. There would be no requirement for any intersection modification due to the construction of the Carling Apartments.

TABLE 4.4
CARLING/MAITLAND INTERSECTION – LOS & v/c

APPROACH	WEEKDAY PEAK AM HOUR Existing - 2017 **Background - 2024** *2029* **Total - *2024*** (2029)		WEEKDAY PEAK PM HOUR Existing - 2017 **Background - 2024** *2029* **Total - *2024*** (2029)	
	LOS	**v/c**	**LOS**	**v/c**
EB Left	A **A** *A* ***A*** (A)	0.318 **0.322** *0.074* ***0.076*** (0.076)	A **A** *A* ***A*** (A)	0.447 **0.458** *0.352* ***0.352*** (0.356)
EB Through	C **C** *F* ***C*** (F)	0.768 **0.792** *1.025* ***0.793*** (1.027)	A **A** *B* ***B*** (B)	0.529 **0.549** *0.637* ***0.637*** (0.639)
EB Right	C **C** *A* ***C*** (A)	0.773 **0.798** *0.424* ***0.800*** (0.425)	A **A** *A* ***A*** (A)	0.545 **0.564** *0.442* ***0.442*** (0.442)
WB Left	B **B** *B* ***B*** (B)	0.645 **0.645** *0.645* ***0.645*** (0.645)	C **C** *C* ***C*** (C)	0.800 **0.800** *0.800* ***0.800*** (0.800)
WB Through	A **A** *A* ***A*** (A)	0.171 **0.181** *0.180* ***0.181*** (0.181)	D **D** *D* ***D*** (D)	0.859 **0.881** *0.849* ***0.849*** (0.851)
WB Right	A **A** *A* ***A*** (A)	0.173 **0.183** *0.182* ***0.183*** (0.183)	D **D** *D* ***D*** (D)	0.864 **0.887** *0.854* ***0.854*** (0.857)
NB Left	E **F** *F* ***F*** (F)	0.947 **1.026** *1.026* ***1.026*** (1.026)	D **F** *F* ***F*** (F)	0.889 **1.015** *1.015* ***1.015*** (1.019)
NB Through/Rt	F **F** *F* ***F*** (F)	1.342 **1.342** *1.342* ***1.342*** (1.342)	E **E** *E* ***E*** (E)	0.968 **0.968** *0.968* ***0.968*** (0.968)
SB Left	F **F** *F* ***F*** (F)	1.268 **1.268** *1.268* ***1 268*** (1.268)	C **C** *C* ***C*** (C)	0.744 **0.744** *0.744* ***0.744*** (0.744)
SB Through/Rt	C **C** *C* ***C*** (C)	0.751 **0.751** *0.751* ***0.751*** (0.751)	A **A** *A* ***A*** (A)	0.514 **0.514** *0.514* ***0.514*** (0.514)
Total	B **B** *A* ***A*** (A)	0.616 **0.629** *0.589* ***0.579*** (0.591)	C **C** *C* ***C*** (C)	0.729 **0.746** *0.737* ***0.737*** (0.773)

The MMLOS level of service was determined for all modes utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines* and the *Multi-Modal Level of Service (MMLOS) Worksheet*. The multi-modal level of service for intersections was examined for the signalized Carling/Iroquois and Carling/Maitland intersections utilizing the 2029 traffic and roadway geometry.

PEDESTRIAN LEVEL OF SERVICE (PLOS) - Intersection Capacity Analysis

Both the Carling/Iroquois and Carling/Maitland intersections have pedestrian activated traffic signals at all approaches. The Carling/Iroquois intersection has an eastbound and westbound Carling Avenue channelized right turn lane.

The MMLOS analysis worksheet provided as Exhibit 4.26 determined both intersections to have a PLOS “F”. The low level of service is mainly attributed to the number of lanes crossed by pedestrians.

BICYCLE LEVEL OF SERVICE (BLOS) - Intersection Capacity Analysis

Carling Avenue is designated as a Spine Route in the TMP. There are no bike lanes along Carling Avenue, but the TMP has identified transit priority measures along Carling

Avenue under the 2031 Affordable Network. The transit priority measures would provide a shared lane for buses and bicycles which the study has assumed to be in place by 2029.

The MMLOS worksheet analysis provided in Exhibit 4.26 determined the Carling/Iroquois and Carling/Maitland intersections to function at a BLOS ”F”. The lower level of service is mainly attributed to the speed of traffic and the number of lanes to be crossed in making a left turn movement.

TRANSIT LEVEL OF SERVICE (TLOS) - Intersection Capacity Analysis

OC Transpo provides transit service along Carling Avenue past the site with Frequent Route 85. Both the Carling/Iroquois and Carling/Maitland intersections determined a TLOS “F” as shown in Exhibit 4.26. The low level of service is attributed to the transit delay at intersections.

TRUCK LEVEL OF SERVICE (TkLOS) - Intersection Capacity Analysis

The analysis determined the Carling/Iroquois and Carling/Maitland intersections to have a TkLOS “E”. The analysis sheet is provided as Exhibit 4.26 with the low level of service attributed to the corner radius at the intersections.

INTERSECTION MMLOS SUMMARY

The Carling/Iroquois and Carling/Maitland intersections were analyzed to determine the level of service which was compared to the MMLOS targets for pedestrians, bicycles, trucks, transit and autos. The calculated Level of Service (LOS) was determined using the *Multi-Modal Level of Service Worksheet* provided as Exhibit 4.26 in the Appendix, and the *Highway Capacity Software, Version 7.9.5* for the vehicle LOS. The LOS targets were obtained from Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines* for a Traditional Mainstreet as designated in the Official Plan - Urban Policy Plan. Table 4.5 summarizes the MMLOS results for the intersections and targets.

TABLE 4.5
MULTI-MODAL (MMLOS) INTERSECTION SUMMARY TABLE

INTERSECTION	Level of Service (LOS) – 2029				
	Pedestrian	Bicycle	Transit	Auto	Truck
Carling/Iroquois					
Calculated	F	F	F	A	E
Target	C	C	C	D	D
Carling/Maitland					
Calculated	F	F	F	A	E
Target	C	C	C	D	D

The pedestrian level of service (PLOS) did not meet the target mainly due to the number of lanes crossed by pedestrians at the intersections.

The lower bicycle level of service (BLOS) was due to the operating speed of vehicles and the number of lanes crossed in making a left turn movement at intersections.

The transit level of service (TLOS) did not meet the target due to the transit delay at intersections.

The truck level of service (TkLOS) did not meet the target due to the curb radius at intersection for trucks to make a right turn maneuver.

MODULE 4.5 – Transportation Demand Management

Element 4.5.1 – Context for TDM

The Carling Apartments is located on a six lane divided arterial road. Carling Avenue has few residential homes along the road in the vicinity of the site. The low number of trips generated by the site would result in a very minor impact for the residents along Carling Avenue. Any additional trips would not trigger the need for additional TDM measures to be implemented.

Element 4.5.2 – Need and Opportunity

The site would generate a small number of new trips which would have a minor impact on the surrounding road network. There would be no requirement for post TDM measures in the event the development does not meet the proposed sustainable mode share target.

Element 4.5.3 – TDM Program

The study utilizes the following TDM Measures Checklist for the apartment development which examines the implementation of facilities that are supportive of sustainable modes.

TDM Measures Checklist:

Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		1.	**TDM PROGRAM MANAGEMENT**	
		1.1	**Program coordinator**	
BASIC	★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐
		1.2	**Travel surveys**	
BETTER		1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2.	**WALKING AND CYCLING**	
		2.1	**Information on walking/cycling routes & destinations**	
BASIC		2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☒ Area maps for walking/cycling can be posted in common areas like the lobby or laundry room
		2.2	**Bicycle skills training**	
BETTER		2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☒ Transit maps and schedules can be posted in common areas like the lobby or laundry room
BETTER	3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
	3.2	**Transit fare incentives**	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
	3.3	**Enhanced public transit service**	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
	3.4	**Private transit service**	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
	4.	**CARSHARING & BIKESHARING**	
	4.1	**Bikeshare stations & memberships**	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
	4.2	**Carshare vehicles & memberships**	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
	5.	**PARKING**	
	5.1	**Priced parking**	
BASIC ★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐ N/A
BASIC ★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☐

TDM measures: *Residential developments*				Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☒ A multimodal travel information package can be included with the leasing agreement
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

MODULE 4.6 – Neighbourhood Traffic Management

Element 4.6.1 – Adjacent Neighbourhoods

Exempt as determined in the Scoping Document.

MODULE 4.7 - Transit

Element 4.7.1 – Route Capacity

The site is well served by OC Transpo bus routes. With the number of expected transit person trips to be low, it would be doubtful if the number of site generated transit trips would determine the need to provide additional capacity to the existing transit routes.

Element 4.7.2 – Transit Priority

The TMP has identified under the 2031 Affordable Network the implementation of exclusive bus lanes and transit signal priority between the Lincoln Fields Transit Station and the Carling Avenue O-Train Station along the Carling Avenue Transit Corridor. The transit priority measures would reduce transit travel time and increases reliability along Carling Avenue.

MODULE 4.8 – Review of Network Concept

Exempt as determined in the Scoping Document.

MODULE 4.9 – Intersection Design

Element 4.9.1 – Intersection Control

The TIA study has examined the Carling/Iroquois and Carling/Maitland intersections which are both controlled by traffic signals. Transit priority measures have already been identified in the TMP. There would be no requirement to change the method of traffic controls at the intersections within the study area due to the impact of the development.

Element 4.9.2 – Intersection Design

The Carling/Iroquois, Carling/Maitland and Site Access/Carling intersections were all examined utilizing the *Multi-Modal Level of Service (MMLOS) Guidelines* and the *Highway Capacity Software, Version 7.9.5,* which uses the capacity analysis procedure as documented in the *Highway Capacity Manual (HCM) 2010 and HCM 6th Edition*.

The intersections were analyzed in Element 4.4.3 - Intersection Design to determine the level of service for each mode of travel. The level of service was completed for the existing traffic counts, background traffic, and total traffic at all three intersections. The analysis years were at the completion of the apartment building in 2024 and at five years beyond completion in 2029.

The calculated 2029 level of service was compared to the level of service targets listed in Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines*. The MMLOS for each signalized intersection is presented in Table 4.5 - MULTI-MODAL (MMLOS) INTERSECTION SUMMARY TABLE contained in this study report.

The following summarizes the calculated 2029 operation of the Carling/Iroquois and Carling/Maitland intersections, and the factors for why they have not met targets for all modes:

Pedestrian (PLOS) - The pedestrian level of service did not meet the target mainly due to the number of lanes crossed by pedestrians at the intersections.

Bicycle (BLOS) - The bicycle level of service did not meet the target mainly due to the speed of traffic and number of lanes crossed by bicycles in making a left turn movement at intersections.

Transit (TLOS) - The transit level of service did not meet the target due to the transit delay at intersections.

Auto (LOS) - The vehicle level of service did meet the MMLOS target.

Truck (TkLOS) - The truck level of service did not meet the target due to the intersection radius for making right turn movements.

SUMMARY

A Site Plan has been prepared for the redevelopment of a 1,451.3 m^2 parcel of land at 1940 Carling Avenue. The apartment building will contain 64 rental apartments. Parking for the development will consist of 32 vehicular parking spaces with 29 of the spaces in an underground garage and 3 surface parking spaces. Bicycle storage will be provided in the parking garage with a bike rack located outside next to the building entrance.

The Carling Apartments development will have one site access onto Carling Avenue. The access will be 6 m in width and would be restricted to right-in/right-out turning movements which would be controlled by a centre median along Carling Avenue. The apartment building is expected to be completed and occupied by the year 2024. The transportation analysis presented in this study has determined the following:

1. The proposed apartment development would consist of 64 apartment units and is expected to generate 2 vehicle trips arriving and 5 vehicle trips departing during the weekday peak AM hour for a total of 7 trips, and 5 vehicle trips arriving and 3 vehicle trips departing during the weekday peak PM hour for a total of 8 trips.

2. The apartment building will have one access point onto Carling Avenue which would provide access to an underground parking garage. There would be no requirement for exclusive turn lanes or roadway modifications to Carling Avenue at the access.

3. The operational and MMLOS analysis of the Carling/Iroquois and Carling/Maitland intersections determined that the development of the Carling Apartments development would not trigger the requirement for intersection modifications.

Prepared by:

David J. Halpenny

David J. Halpenny, M. Eng., P. Eng.

APPENDIX

CERTIFICATION FORM

SCREENING FORM

TRAFFIC COUNTS

OC TRANSPO BUS ROUTE MAPS

COLLISION SUMMARY

MULTI-MODAL LEVEL OF SERVICE - Segment Forms

OPERATIONAL ANALYSIS WORK SHEETS - Intersections

EXHIBIT 1.1
CERTIFICATION FORM

Transportation Impact Assessment Guidelines

Certification Form for TIA Study PM

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

- [X] I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
- [X] I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- [X] I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- [X] I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise
  - [X] is either transportation engineering
  - [ ] or transportation planning .

[1,2] License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Dated at Ottawa (City) this 2nd day of September, 20 21.

Name : David J. Halpenny

Professional title: President, D. J. Halpenny & Associates Ltd.

D J Halpenny

Signature of individual certifier that s/he meets the above criteria

Office Contact Information (Please Print)	
Address:	P.O. Box 774
City / Postal Code:	Manotick ON K4M 1A7
Telephone / Extension:	613-692-8662
E-Mail Address:	David@DJHalpenny.com

Stamp

EXHIBIT 1.2
SCREENING FORM

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**1940 Carling Avenue, City of Ottawa**
Description of Location	South side of Carling Ave., 315 m west of Maitland Ave. (See Figure 2.1)
Land Use Classification	"AM10[2118] H(20)" Zoning – Arterial Mainstreet Zone
Development Size (units)	64 Apartment Units (See Figure 2.2)
Development Size (ha)	1,451.03 m^2 Lot Area
Number of Accesses and Locations	One access onto Carling Avenue
Phase of Development	Single Phase of development
Buildout Year	2024

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Apartment Units	64 units

	Yes	No
64 Apartment Units < 90 Minimum Development Size		X

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	X	
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*	X	

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		X
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

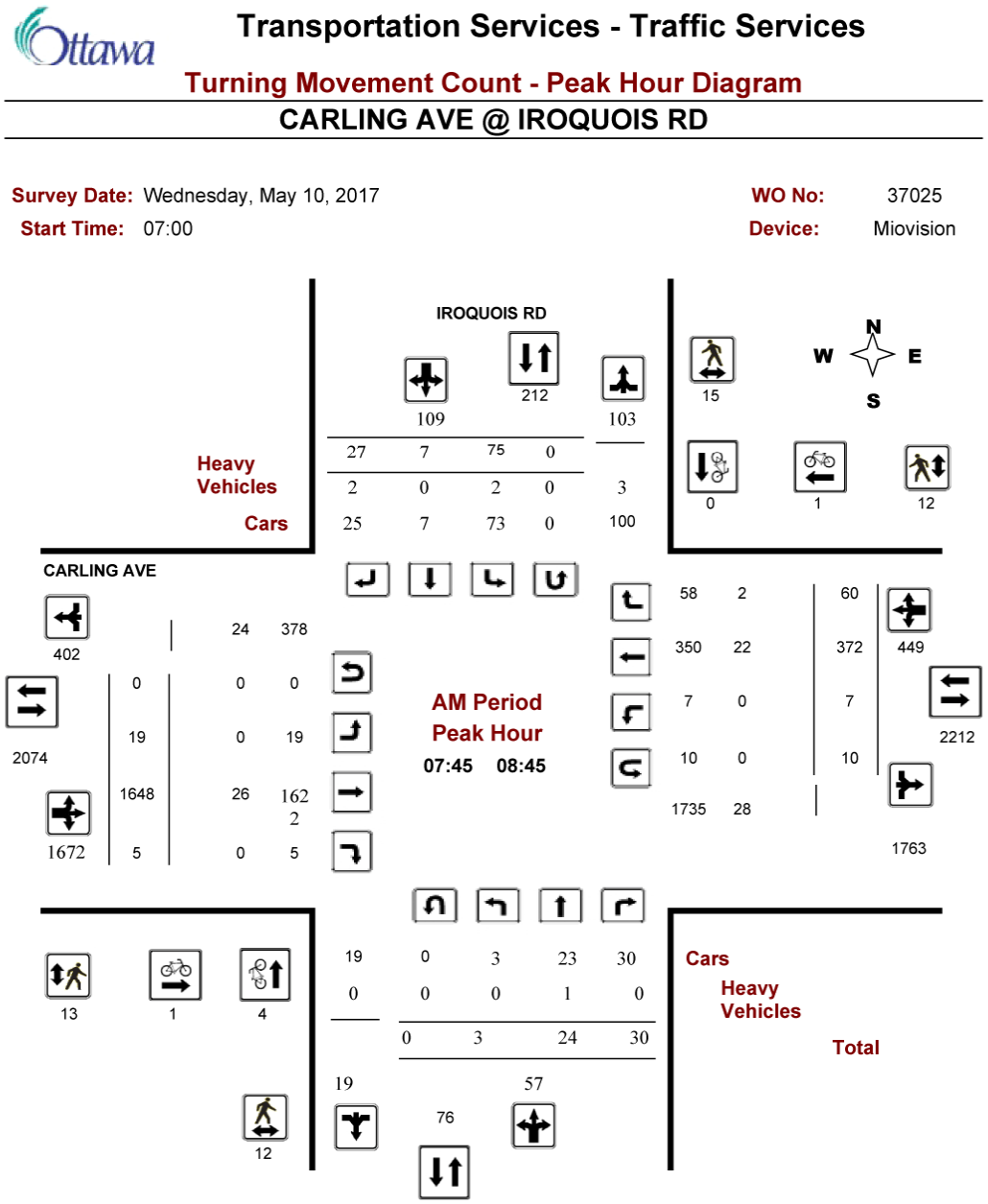
If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		X
Does the development satisfy the Location Trigger?	X	
Does the development satisfy the Safety Trigger?		X

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

EXHIBIT 2.1
2017 PEAK AM HOUR TRAFFIC COUNTS - CARLING/IROQUOIS INTERSECTION



2017 PEAK PM HOUR TRAFFIC COUNTS - CARLING/IROQUOIS INTERSECTION

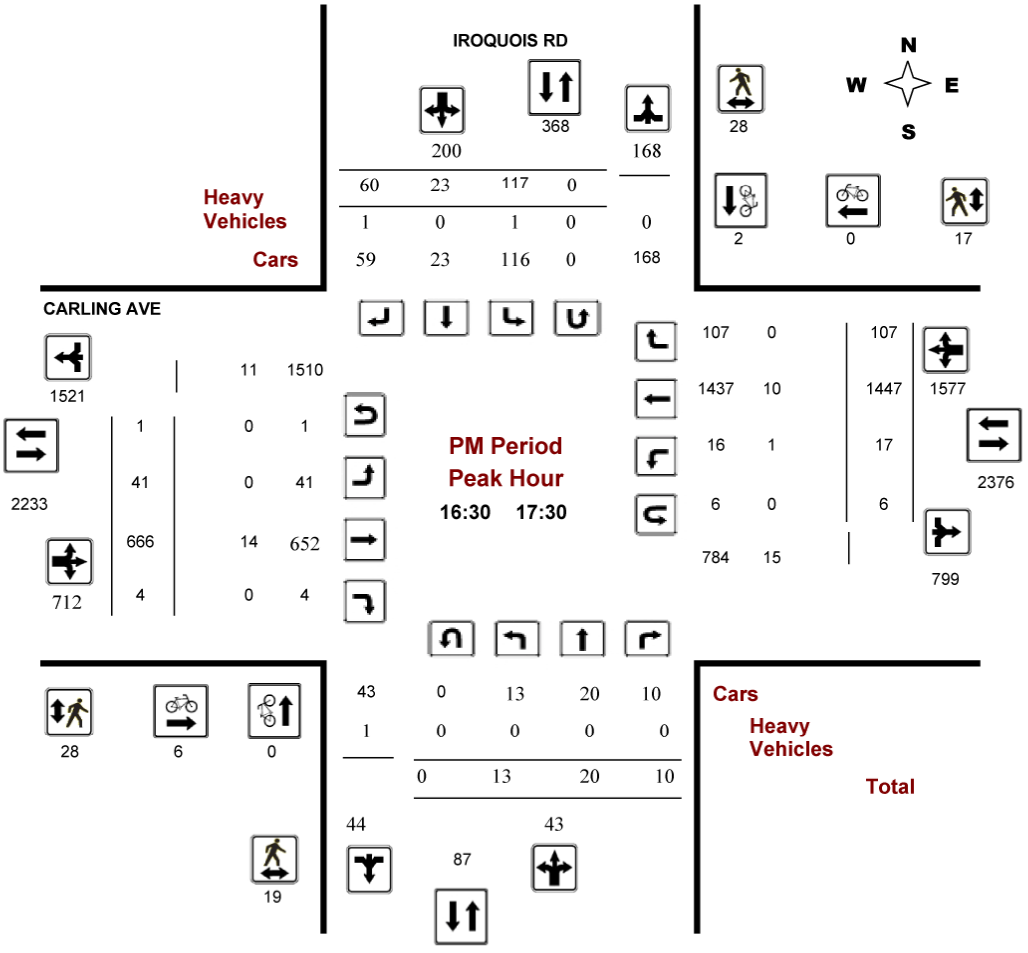
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CARLING AVE @ IROQUOIS RD

Survey Date: Wednesday, May 10, 2017 **WO No:** 37025

Start Time: 07:00 **Device:** Miovision



Comments

2017 TRAFFIC SUMMARY (8 Hour) - CARLING/IROQUOIS INTERSECTION

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ IROQUOIS RD

Survey Date: Wednesday, May 10, 2017 **WO No:** 37025

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, May 10, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 14 Westbound: 56

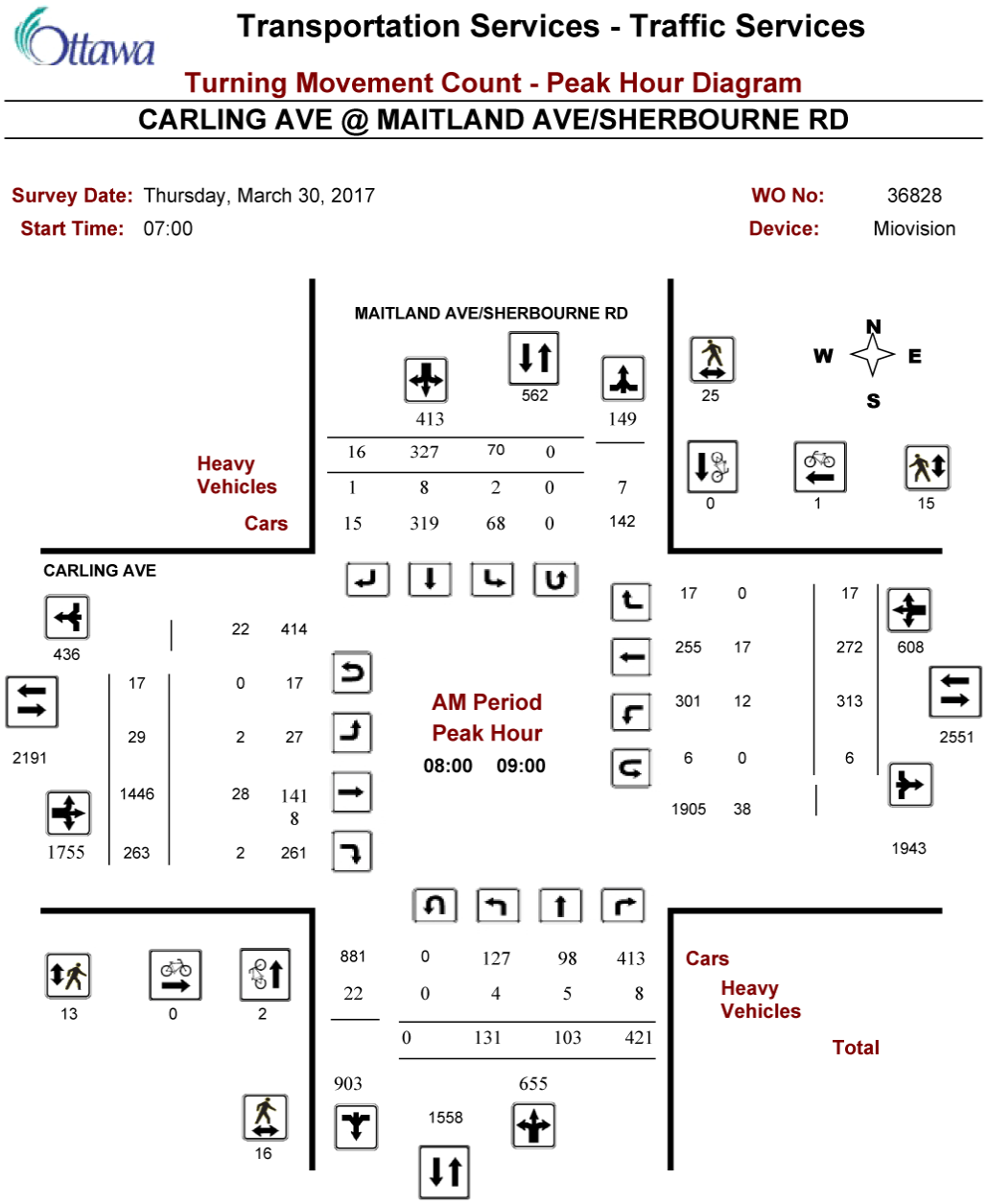
AADT Factor

.90

	IROQUOIS RD								CARLING AVE									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	1	11	22	**34**	40	3	19	**62**	**96**	11	1713	2	**1726**	6	263	45	**314**	**2040**	**2136**
08:00 09:00	4	30	30	**64**	81	9	35	**125**	**189**	24	1566	10	**1600**	8	408	68	**484**	**2084**	**2273**
09:00 10:00	10	11	17	**38**	73	10	38	**121**	**159**	45	977	4	**1026**	7	451	89	**547**	**1573**	**1732**
11:30 12:30	12	19	19	**50**	116	17	48	**181**	**231**	45	790	10	**845**	7	701	110	**818**	**1663**	**1894**
12:30 13:30	7	10	9	**26**	111	20	64	**195**	**221**	37	684	12	**733**	11	694	104	**809**	**1542**	**1763**
15:00 16:00	9	21	12	**42**	111	23	58	**192**	**234**	32	628	10	**670**	17	1043	117	**1177**	**1847**	**2081**
16:00 17:00	11	17	13	**41**	109	34	48	**191**	**232**	33	609	3	**645**	17	1409	105	**1531**	**2176**	**2408**
17:00 18:00	10	16	10	**36**	112	24	68	**204**	**240**	54	714	11	**779**	21	1290	113	**1424**	**2203**	**2443**
Sub Total	64	135	132	**331**	753	140	378	**1271**	**1602**	281	7681	62	**8024**	94	6259	751	**7104**	**15128**	**16730**
U Turns				**0**				**0**	**0**				**14**				**56**	**70**	**70**
Total	64	135	132	**331**	753	140	378	**1271**	**1602**	281	7681	62	**8038**	94	6259	751	**7160**	**15198**	**16800**
EQ 12Hr	89	188	183	**460**	1047	195	525	**1767**	**2227**	391	10677	86	**11173**	131	8700	1044	**9952**	**21125**	**23352**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	75	159	156	**390**	888	165	446	**1499**	**2004**	331	9056	73	**9477**	111	7379	885	**8442**	**19012**	**21017**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**0.9**						
AVG 24Hr	99	209	204	**511**	1163	216	584	**1963**	**2474**	434	11863	96	**12415**	145	9667	1160	**11059**	**23474**	**25948**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

EXHIBIT 2.2
2017 PEAK AM HOUR TRAFFIC COUNTS - CARLING/MAITLAND INTERSECTION



2017 PEAK PM HOUR TRAFFIC COUNTS - CARLING/MAITLAND INTERSECTION

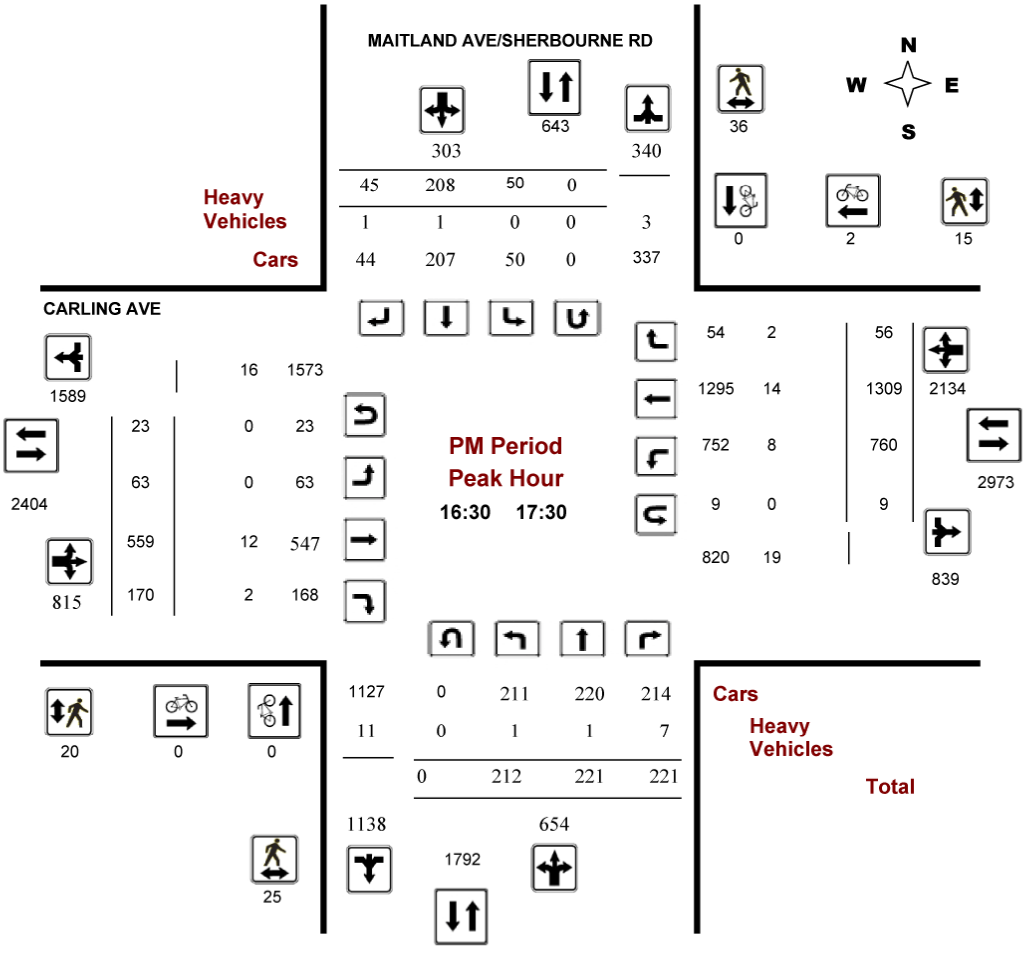
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CARLING AVE @ MAITLAND AVE/SHERBOURNE RD

Survey Date: Thursday, March 30, 2017 **WO No:** 36828

Start Time: 07:00 **Device:** Miovision



Comments

2017 TRAFFIC SUMMARY (8 Hour) - CARLING/MAITLAND INTERSECTION

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ MAITLAND AVE/SHERBOURNE RD

Survey Date: Thursday, March 30, 2017 **WO No:** 36828

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, March 30, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 133 Westbound: 129

AADT Factor 1.00

	MAITLAND AVE/SHERBOURNE RD									CARLING AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	88	73	264	**425**	56	228	8	**292**	**717**	17	1267	192	**1476**	223	201	17	**441**	**1917**	**2634**
08:00 09:00	131	103	421	**655**	70	327	16	**413**	**1068**	29	1446	263	**1738**	313	272	17	**602**	**2340**	**3408**
09:00 10:00	153	127	334	**614**	52	241	18	**311**	**925**	37	717	174	**928**	309	388	29	**726**	**1654**	**2579**
11:30 12:30	235	197	288	**720**	57	195	23	**275**	**995**	49	557	182	**788**	428	582	50	**1060**	**1848**	**2843**
12:30 13:30	225	156	287	**668**	62	163	23	**248**	**916**	59	614	202	**875**	420	605	49	**1074**	**1949**	**2865**
15:00 16:00	181	200	257	**638**	65	230	27	**322**	**960**	62	576	138	**776**	604	1022	51	**1677**	**2453**	**3413**
16:00 17:00	215	212	241	**668**	48	210	43	**301**	**969**	56	530	180	**766**	738	1254	53	**2045**	**2811**	**3780**
17:00 18:00	198	225	236	**659**	63	215	46	**324**	**983**	66	561	170	**797**	713	1240	52	**2005**	**2802**	**3785**
Sub Total	1426	1293	2328	**5047**	473	1809	204	**2486**	**7533**	375	6268	1501	**8144**	3748	5564	318	**9630**	**17774**	**25307**
U Turns				**0**				**0**	**0**				**133**				**129**	**262**	**262**
Total	1426	1293	2328	**5047**	473	1809	204	**2486**	**7533**	375	6268	1501	**8277**	3748	5564	318	**9759**	**18036**	**25569**
EQ 12Hr	1982	1797	3236	**7015**	657	2515	284	**3456**	**10471**	521	8713	2086	**11505**	5210	7734	442	**13565**	**25070**	**35541**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1868	1694	3050	**6612**	620	2370	267	**3257**	**10471**	491	8211	1966	**10843**	4910	7289	417	**12784**	**25070**	**35541**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	2447	2219	3995	**8661**	812	3104	350	**4266**	**12927**	644	10757	2576	**14204**	6432	9548	546	**16747**	**30951**	**43878**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

EXHIBIT 2.3
OC TRANSPO ROUTE MAPS

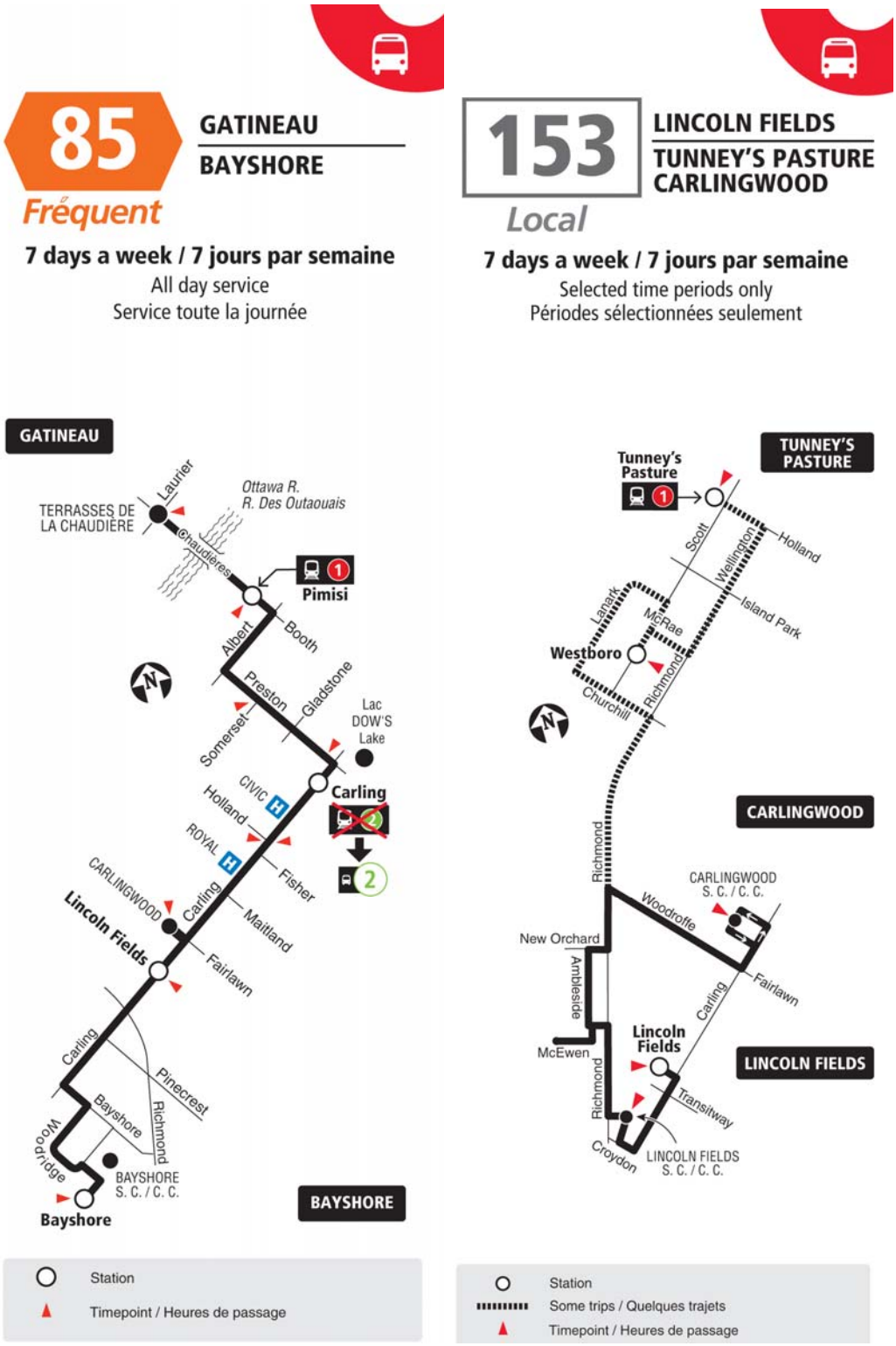


EXHIBIT 2.4
COLLISION SUMMARY

YEAR	COLLISION TYPE					TOTAL
	REAR END	ANGULAR	TURNING	SIDESWIPE	OTHER (SMV)	
Intersection of Carling Avenue and Maitland Avenue						
2015	9	1	1	2	0	13
2016	5	0	0	4	0	9
2017	7	1	0	5	0	13
2018	5	1	3	6	1	16
2019	2	3	3	3	1	12
Total	28	6	7	20	2	63
Intersection of Carling Avenue and Iroquois Road						
2015	0	1	0	0	0	1
2016	1	2	3	0	0	6
2017	1	6	2	2	1	12
2018	2	2	6	1	0	11
2019	0	2	0	0	2	4
Total	4	13	11	3	3	34
Carling Avenue Road Segment between Maitland Ave. and Iroquois Rd.						
2015	2	1	1	2	2	8
2016	2	0	2	0	1	5
2017	2	0	0	0	2	4
2018	1	0	0	1	0	2
2019	1	3	0	2	1	7
Total	8	4	3	5	6	26

EXHIBIT 4.1
2029 MMLOS ROAD SEGMENT - Carling Avenue

Multi-Modal Level of Service - Segments Form

Consultant		Project	Carling Apt.
Scenario	Total 2029 Traffic	Date	Jan-22
Comments	Carling Avenue		
	Iroquois Road to Maitland Avenue		

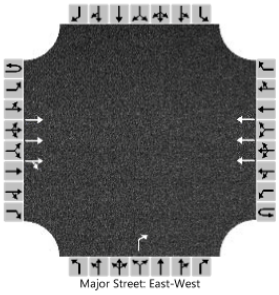
SEGMENTS		Carling Avenue	Iroquois to Site	Site to Maitland	Section
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width	D	1.8 m < 0.5 m	1.8 m < 0.5 m	
	Avg Daily Curb Lane Traffic Volume		≤ 3000	≤ 3000	
	Operating Speed On-Street Parking		> 60 km/h no	> 60 km/h no	
	Exposure to Traffic PLoS		D	D	-
	Effective Sidewalk Width		2.0 m	2.0 m	
	Pedestrian Volume		250 ped/hr	250 ped/hr	
	Crowding PLoS		B	B	-
	Level of Service		D	D	-
Bicycle	Type of Cycling Facility	C	Curbside Bike Lane	Curbside Bike Lane	
	Number of Travel Lanes		2 ea. dir. (w median)	2 ea. dir. (w median)	
	Operating Speed		>50 to 70 km/h	>50 to 70 km/h	
	# of Lanes & Operating Speed LoS		C	C	-
	Bike Lane (+ Parking Lane) Width		≥ 1.8 m	≥ 1.8 m	
	Bike Lane Width LoS		A	A	-
	Bike Lane Blockages		Rare	Rare	
	Blockage LoS		A	A	-
	Median Refuge Width (no median = < 1.8 m)		≥ 1.8 m refuge	≥ 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		4-5 lanes	4-5 lanes	
	Sidestreet Operating Speed		>40 to 50 km/h	>40 to 50 km/h	
	Unsignalized Crossing - Lowest LoS		B	B	-
	Level of Service		C	C	-
Transit	Facility Type	B	Bus lane	Bus lane	
	Friction or Ratio Transit:Posted Speed		Cf ≤ 60	Cf ≤ 60	
	Level of Service		B	B	-
Truck	Truck Lane Width	A	> 3.7 m	> 3.7 m	
	Travel Lanes per Direction		> 1	> 1	
	Level of Service		A	A	-

EXHIBIT 4.2
2024 PEAK AM HOUR TOTAL TRAFFIC ANALYSIS - Site Access/Carling

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Site Access/Carling
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	12/31/2021	East/West Street	Carling Avenue
Analysis Year	2024	North/South Street	Site Access
Time Analyzed	Peak AM Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Carling Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	3	0	0	0	3	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			1809	2			467					5				
Percent Heavy Vehicles (%)												0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												7.1				
Critical Headway (sec)												7.10				
Base Follow-Up Headway (sec)												3.9				
Follow-Up Headway (sec)												3.90				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												5				
Capacity, c (veh/h)												208				
v/c Ratio												0.03				
95% Queue Length, Q_{95} (veh)												0.1				
Control Delay (s/veh)												22.8				
Level of Service (LOS)												C				
Approach Delay (s/veh)										22.8						
Approach LOS										C						

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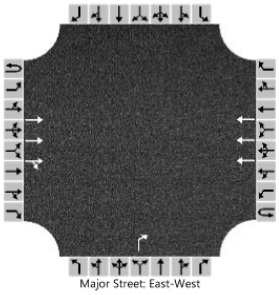
EXHIBIT 4.3
2024 PEAK PM HOUR TOTAL TRAFFIC ANALYSIS - Site Access/Carling

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Site Access/Carling
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	12/31/2021	East/West Street	Carling Avenue
Analysis Year	2024	North/South Street	Site Access
Time Analyzed	Peak PM Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Carling Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	3	0	0	0	3	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			846	5			1657					3				
Percent Heavy Vehicles (%)												0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												7.1				
Critical Headway (sec)												7.10				
Base Follow-Up Headway (sec)												3.9				
Follow-Up Headway (sec)												3.90				

Delay, Queue Length, and Level of Service

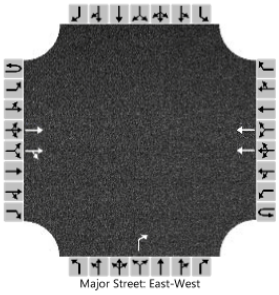
Flow Rate, v (veh/h)												3				
Capacity, c (veh/h)												440				
v/c Ratio												0.01				
95% Queue Length, Q_{95} (veh)												0.0				
Control Delay (s/veh)												13.2				
Level of Service (LOS)												B				
Approach Delay (s/veh)										13.2						
Approach LOS										B						

EXHIBIT 4.4
2029 PEAK AM HOUR TOTAL TRAFFIC ANALYSIS - Site Access/Carling

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Site Access/Carling
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	12/31/2021	East/West Street	Carling Avenue
Analysis Year	2029	North/South Street	Site Access
Time Analyzed	Peak AM Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Carling Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			1809	2			467					5				
Percent Heavy Vehicles (%)												0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.90				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												5				
Capacity, c (veh/h)												242				
v/c Ratio												0.02				
95% Queue Length, Q_{95} (veh)												0.1				
Control Delay (s/veh)												20.2				
Level of Service (LOS)												C				
Approach Delay (s/veh)										20.2						
Approach LOS										C						

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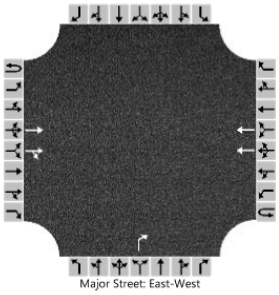
EXHIBIT 4.5
2029 PEAK PM HOUR TOTAL TRAFFIC ANALYSIS - Site Access/Carling

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Site Access/Carling
Agency/Co.		Jurisdiction	City of Ottawa
Date Performed	12/31/2021	East/West Street	Carling Avenue
Analysis Year	2029	North/South Street	Site Access
Time Analyzed	Peak PM Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Carling Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			846	5			1657					3				
Percent Heavy Vehicles (%)												0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.90				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.30				

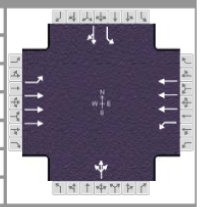
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												3				
Capacity, c (veh/h)												515				
v/c Ratio												0.01				
95% Queue Length, Q_{95} (veh)												0.0				
Control Delay (s/veh)												12.0				
Level of Service (LOS)												B				
Approach Delay (s/veh)										12.0						
Approach LOS										B						

EXHIBIT 4.6
2017 PEAK AM HOUR EXISTING TRAFFIC ANALYSIS - Carling/Iroquois

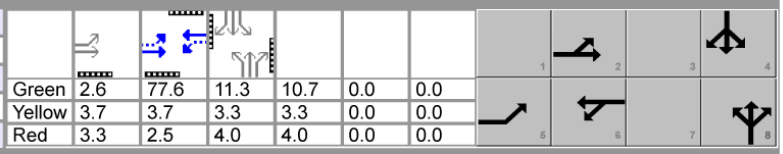
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2017_ex_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	19	1648		17	372		3	24	30	75	7	27

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	2.6	77.6	11.3	10.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	9.6	93.5		83.8		18.0		18.6
Change Period, ($Y+R_c$), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.3		3.2
Queue Clearance Time (g_s), s	2.4					6.8		8.0
Green Extension Time (g_e), s	0.0	0.0		0.0		0.1		0.2
Phase Call Probability	0.53					0.89		0.99
Max Out Probability	0.00					0.00		0.00

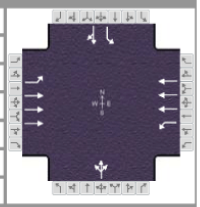
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	1791		18	404			62		82	37	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1622		268	1558			1579		1688	1454	
Queue Service Time (g_s), s	0.4	24.3		4.9	4.9			4.8		6.0	3.1	
Cycle Queue Clearance Time (g_c), s	0.4	24.3		19.6	4.9			4.8		6.0	3.1	
Green Ratio (*g/C*)	0.75	0.68		0.60	0.60			0.09		0.09	0.09	
Capacity (*c*), veh/h	812	3303		187	2827			142		159	137	
Volume-to-Capacity Ratio (*X*)	0.025	0.542		0.099	0.143			0.438		0.511	0.269	
Back of Queue (*Q*), ft/ln (95 th percentile)	5.4	325.8		16.1	79			87.8		117.9	53.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	12.9		0.6	3.0			3.5		4.6	2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00		0.25	0.00			0.00		0.60	0.00	
Uniform Delay (d_1), s/veh	4.2	10.8		18.0	11.1			56.1		56.0	54.7	
Incremental Delay (d_2), s/veh	0.0	0.6		1.1	0.1			0.8		0.9	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	4.2	11.4		19.1	11.2			56.9		57.0	55.1	
Level of Service (LOS)	A	B		B	B			E		E	E	
Approach Delay, s/veh / LOS	11.3	B		11.6	B		56.9	E		56.4	E	
Intersection Delay, s/veh / LOS	14.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.89	B	2.62	C	2.61	C
Bicycle LOS Score / LOS	1.48	A	0.72	A	0.59	A	0.68	A

EXHIBIT 4.7
2017 PEAK PM HOUR EXISTING TRAFFIC ANALYSIS - Carling/Iroquois

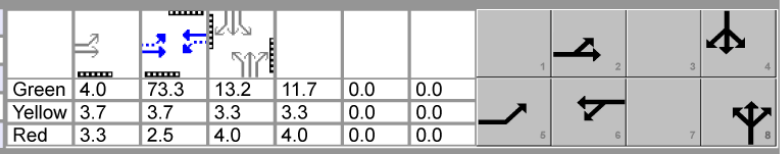
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2017_ex_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	42	666		23	1447		13	20	10	117	23	60

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	4.0	73.3	13.2	11.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	11.0	90.5		79.5		19.0		20.5
Change Period, ($Y+R_c$), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s	3.0					5.4		11.4
Green Extension Time (g_e), s	0.1	0.0		0.0		0.1		0.4
Phase Call Probability	0.81					0.82		1.00
Max Out Probability	0.00					0.00		0.00

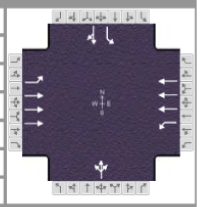
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	46	724		25	1573			47		127	90	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1609		737	1622			1662		1701	1506	
Queue Service Time (g_s), s	1.0	7.9		2.0	26.6			3.4		9.4	7.4	
Cycle Queue Clearance Time (g_c), s	1.0	7.9		2.0	26.6			3.4		9.4	7.4	
Green Ratio (*g/C*)	0.73	0.66		0.57	0.57			0.10		0.11	0.11	
Capacity (*c*), veh/h	352	3167		476	2779			163		185	164	
Volume-to-Capacity Ratio (*X*)	0.130	0.229		0.052	0.566			0.287		0.686	0.550	
Back of Queue (*Q*), ft/ln (95 th percentile)	14.1	123		15.7	376.8			64.5		185.2	128.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	4.8		0.6	15.0			2.6		7.3	5.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.11	0.00		0.24	0.00			0.00		0.95	0.00	
Uniform Delay (d_1), s/veh	8.5	9.2		12.4	17.7			54.4		55.8	54.9	
Incremental Delay (d_2), s/veh	0.1	0.2		0.2	0.8			0.4		1.7	1.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	8.5	9.4		12.6	18.5			54.8		57.4	56.0	
Level of Service (LOS)	A	A		B	B			D		E	E	
Approach Delay, s/veh / LOS	9.3	A		18.4	B		54.8	D		56.8	E	
Intersection Delay, s/veh / LOS	19.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.66	B	1.90	B	2.62	C	2.61	C
Bicycle LOS Score / LOS	0.91	A	1.37	A	0.56	A	0.85	A

EXHIBIT 4.8
2024 PEAK AM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Iroquois

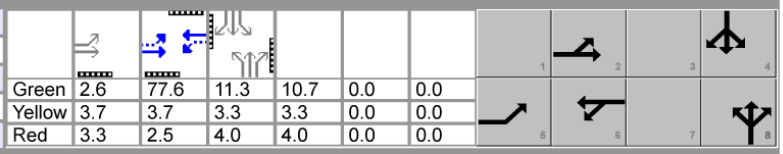
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2024_bak_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	19	1688		24	414		3	24	30	75	7	27

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	2.6	77.6	11.3	10.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	9.6	93.5		83.8		18.0		18.6
Change Period, (*Y*+*R c*), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.3		3.2
Queue Clearance Time (*g s*), s	2.4					6.8		8.0
Green Extension Time (*g e*), s	0.0	0.0		0.0		0.1		0.2
Phase Call Probability	0.53					0.89		0.99
Max Out Probability	0.00					0.00		0.00

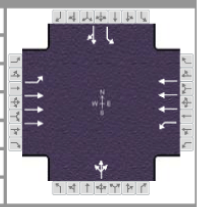
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	1835		26	450			62		82	37	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1622		257	1558			1579		1688	1454	
Queue Service Time (*g s*), s	0.4	25.3		7.6	5.5			4.8		6.0	3.1	
Cycle Queue Clearance Time (*g c*), s	0.4	25.3		23.3	5.5			4.8		6.0	3.1	
Green Ratio (*g/C*)	0.75	0.68		0.60	0.60			0.09		0.09	0.09	
Capacity (*c*), veh/h	782	3303		180	2827			142		159	137	
Volume-to-Capacity Ratio (*X*)	0.026	0.555		0.145	0.159			0.438		0.511	0.269	
Back of Queue (*Q*), ft/ln (95 th percentile)	5.4	336.3		24.1	88.7			87.8		117.9	53.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	13.3		1.0	3.4			3.5		4.6	2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00		0.37	0.00			0.00		0.60	0.00	
Uniform Delay (*d 1*), s/veh	4.2	10.9		19.2	11.2			56.1		56.0	54.7	
Incremental Delay (*d 2*), s/veh	0.0	0.7		1.7	0.1			0.8		0.9	0.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	4.2	11.6		20.9	11.3			56.9		57.0	55.1	
Level of Service (LOS)	A	B		C	B			E		E	E	
Approach Delay, s/veh / LOS	11.5	B		11.9	B		56.9	E		56.4	E	
Intersection Delay, s/veh / LOS	14.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.89	B	2.62	C	2.61	C
Bicycle LOS Score / LOS	1.51	B	0.75	A	0.59	A	0.68	A

EXHIBIT 4.9
2024 PEAK PM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Iroquois

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2024_bak_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	42	689		27	1489		13	20	10	117	23	60

Signal Information					EB			WB			NB			SB		
Cycle, s	130.0	Reference Phase	2		L	T	R	L	T	R	L	T	R	L	T	R
Offset, s	0	Reference Point	End	Green	4.0	73.3		13.2	11.7	0.0		0.0				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.7	3.7		3.3	3.3	0.0		0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.3	2.5		4.0	4.0	0.0		0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	11.0	90.5		79.5		19.0		20.5
Change Period, (*Y*+*R c*), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		3.2
Queue Clearance Time (*g s*), s	3.0					5.4		11.4
Green Extension Time (*g e*), s	0.1	0.0		0.0		0.1		0.4
Phase Call Probability	0.81					0.82		1.00
Max Out Probability	0.00					0.00		0.00

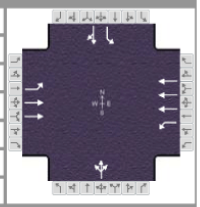
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	46	749		29	1618			47		127	90	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1609		720	1622			1662		1701	1506	
Queue Service Time (*g s*), s	1.0	8.2		2.4	27.8			3.4		9.4	7.4	
Cycle Queue Clearance Time (*g c*), s	1.0	8.2		2.4	27.8			3.4		9.4	7.4	
Green Ratio (*g*/*C*)	0.73	0.66		0.57	0.57			0.10		0.11	0.11	
Capacity (*c*), veh/h	343	3167		467	2779			163		185	164	
Volume-to-Capacity Ratio (*X*)	0.133	0.236		0.063	0.582			0.287		0.686	0.550	
Back of Queue (*Q*), ft/ln (95 th percentile)	14.1	127.9		18.5	390.4			64.5		185.2	128.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	5.0		0.7	15.5			2.6		7.3	5.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.11	0.00		0.29	0.00			0.00		0.95	0.00	
Uniform Delay (*d 1*), s/veh	8.8	9.3		12.5	17.9			54.4		55.8	54.9	
Incremental Delay (*d 2*), s/veh	0.1	0.2		0.3	0.9			0.4		1.7	1.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	8.9	9.4		12.7	18.8			54.8		57.4	56.0	
Level of Service (LOS)	A	A		B	B			D		E	E	
Approach Delay, s/veh / LOS	9.4	A		18.7	B		54.8	D		56.8	E	
Intersection Delay, s/veh / LOS	19.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.66	B	1.90	B	2.62	C	2.61	C
Bicycle LOS Score / LOS	0.92	A	1.39	A	0.56	A	0.85	A

EXHIBIT 4.10
2029 PEAK AM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Iroquois

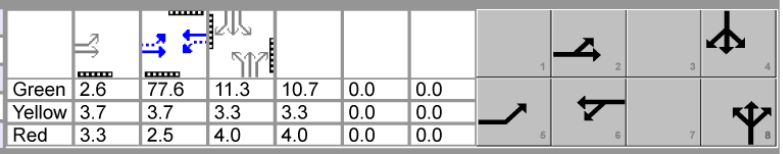
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2029_bak_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	19	1688		24	414		3	24	30	75	7	27

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	2.6	77.6	11.3	10.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	9.6	93.5		83.8		18.0		18.6
Change Period, (*Y*+*R c*), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.3		3.2
Queue Clearance Time (*g s*), s	2.4					6.8		8.0
Green Extension Time (*g e*), s	0.0	0.0		0.0		0.1		0.2
Phase Call Probability	0.53					0.89		0.99
Max Out Probability	0.00					0.00		0.00

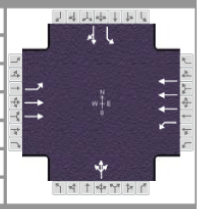
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	1835		26	450			62		82	37	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1700		257	1558			1579		1688	1454	
Queue Service Time (*g s*), s	0.4	48.9		10.2	5.5			4.8		6.0	3.1	
Cycle Queue Clearance Time (*g c*), s	0.4	48.9		49.6	5.5			4.8		6.0	3.1	
Green Ratio (*g/C*)	0.75	0.68		0.60	0.60			0.09		0.09	0.09	
Capacity (*c*), veh/h	782	2309		133	2827			142		159	137	
Volume-to-Capacity Ratio (*X*)	0.026	0.795		0.196	0.159			0.438		0.511	0.269	
Back of Queue (*Q*), ft/ln (95 th percentile)	5.4	624.7		34.3	88.7			87.8		117.9	53.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	24.8		1.4	3.4			3.5		4.6	2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00		0.53	0.00			0.00		0.60	0.00	
Uniform Delay (*d 1*), s/veh	4.2	14.8		35.2	11.2			56.1		56.0	54.7	
Incremental Delay (*d 2*), s/veh	0.0	2.9		3.3	0.1			0.8		0.9	0.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	4.2	17.7		38.5	11.3			56.9		57.0	55.1	
Level of Service (LOS)	A	B		D	B			E		E	E	
Approach Delay, s/veh / LOS	17.6	B		12.8	B		56.9	E		56.4	E	
Intersection Delay, s/veh / LOS	19.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.89	B	2.48	B	2.47	B
Bicycle LOS Score / LOS	2.02	B	0.75	A	0.59	A	0.68	A

EXHIBIT 4.11
2029 PEAK PM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Iroquois

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2029_bak_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	42	689		27	1489		13	20	10	117	23	60

Signal Information					EB			WB			NB			SB		
Cycle, s	130.0	Reference Phase	2		L	T	R	L	T	R	L	T	R	L	T	R
Offset, s	0	Reference Point	End	Green	4.0	73.3		13.2	11.7	0.0	0.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.7	3.7		3.3	3.3	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.3	2.5		4.0	4.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	11.0	90.5		79.5		19.0		20.5
Change Period, (*Y*+*R c*), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		3.2
Queue Clearance Time (*g s*), s	3.0					5.4		11.4
Green Extension Time (*g e*), s	0.1	0.0		0.0		0.1		0.4
Phase Call Probability	0.81					0.82		1.00
Max Out Probability	0.00					0.00		0.00

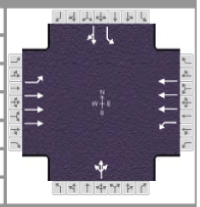
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	46	749		29	1618			47		127	90	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1687		720	1622			1662		1701	1506	
Queue Service Time (*g s*), s	1.0	12.8		2.4	27.8			3.4		9.4	7.4	
Cycle Queue Clearance Time (*g c*), s	1.0	12.8		4.2	27.8			3.4		9.4	7.4	
Green Ratio (*g*/*C*)	0.73	0.66		0.57	0.57			0.10		0.11	0.11	
Capacity (*c*), veh/h	343	2214		457	2779			163		185	164	
Volume-to-Capacity Ratio (*X*)	0.133	0.338		0.064	0.582			0.287		0.686	0.550	
Back of Queue (*Q*), ft/ln (95 th percentile)	14.1	206.2		19.2	390.4			64.5		185.2	128.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	8.1		0.8	15.5			2.6		7.3	5.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.11	0.00		0.30	0.00			0.00		0.95	0.00	
Uniform Delay (*d 1*), s/veh	8.8	10.1		13.2	17.9			54.4		55.8	54.9	
Incremental Delay (*d 2*), s/veh	0.1	0.4		0.3	0.9			0.4		1.7	1.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	8.9	10.5		13.5	18.8			54.8		57.4	56.0	
Level of Service (LOS)	A	B		B	B			D		E	E	
Approach Delay, s/veh / LOS	10.4	B		18.7	B		54.8	D		56.8	E	
Intersection Delay, s/veh / LOS	19.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.66	B	1.90	B	2.48	B	2.47	B
Bicycle LOS Score / LOS	1.14	A	1.39	A	0.56	A	0.85	A

EXHIBIT 4.12
2024 PEAK AM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Iroquois

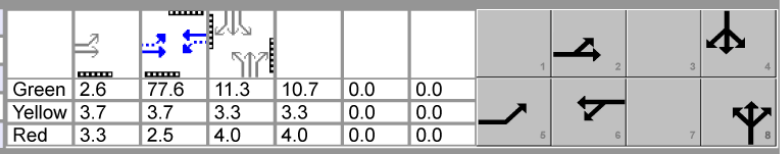
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2024_tot_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	19	1689		24	417		3	24	30	75	7	27

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	2.6	77.6	11.3	10.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	9.6	93.5		83.8		18.0		18.6
Change Period, ($Y+R_c$), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.3		3.2
Queue Clearance Time (g_s), s	2.4					6.8		8.0
Green Extension Time (g_e), s	0.0	0.0		0.0		0.1		0.2
Phase Call Probability	0.53					0.89		0.99
Max Out Probability	0.00					0.00		0.00

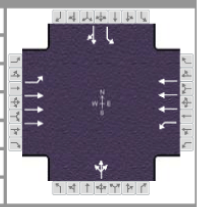
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	1836		26	453			62		82	37	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1622		257	1558			1579		1688	1454	
Queue Service Time (g_s), s	0.4	25.3		7.6	5.5			4.8		6.0	3.1	
Cycle Queue Clearance Time (g_c), s	0.4	25.3		23.3	5.5			4.8		6.0	3.1	
Green Ratio (*g/C*)	0.75	0.68		0.60	0.60			0.09		0.09	0.09	
Capacity (*c*), veh/h	780	3303		180	2827			142		159	137	
Volume-to-Capacity Ratio (*X*)	0.026	0.556		0.145	0.160			0.438		0.511	0.269	
Back of Queue (*Q*), ft/ln (95 th percentile)	5.4	336.4		24.1	89.6			87.8		117.9	53.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	13.4		1.0	3.4			3.5		4.6	2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00		0.37	0.00			0.00		0.60	0.00	
Uniform Delay (d_1), s/veh	4.2	10.9		19.3	11.2			56.1		56.0	54.7	
Incremental Delay (d_2), s/veh	0.0	0.7		1.7	0.1			0.8		0.9	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	4.2	11.6		21.0	11.4			56.9		57.0	55.1	
Level of Service (LOS)	A	B		C	B			E		E	E	
Approach Delay, s/veh / LOS	11.5	B		11.9	B		56.9	E		56.4	E	
Intersection Delay, s/veh / LOS	14.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.89	B	2.62	C	2.61	C
Bicycle LOS Score / LOS	1.51	B	0.75	A	0.59	A	0.68	A

EXHIBIT 4.13
2024 PEAK PM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Iroquois

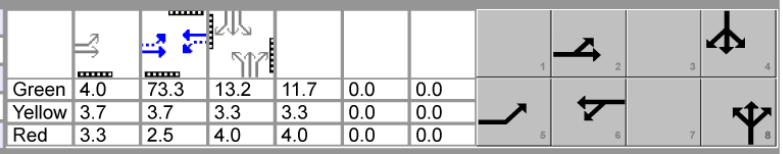
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2024_tot_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	42	690		27	1490		13	20	10	117	23	60

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	4.0	73.3	13.2	11.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	11.0	90.5		79.5		19.0		20.5
Change Period, (*Y*+*R c*), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		3.2
Queue Clearance Time (*g s*), s	3.0					5.4		11.4
Green Extension Time (*g e*), s	0.1	0.0		0.0		0.1		0.4
Phase Call Probability	0.81					0.82		1.00
Max Out Probability	0.00					0.00		0.00

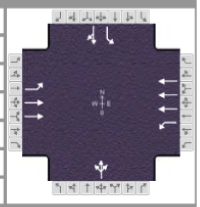
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	46	750		29	1620			47		127	90	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1609		719	1622			1662		1701	1506	
Queue Service Time (*g s*), s	1.0	8.2		2.4	27.8			3.4		9.4	7.4	
Cycle Queue Clearance Time (*g c*), s	1.0	8.2		2.4	27.8			3.4		9.4	7.4	
Green Ratio (*g*/*C*)	0.73	0.66		0.57	0.57			0.10		0.11	0.11	
Capacity (*c*), veh/h	343	3167		466	2779			163		185	164	
Volume-to-Capacity Ratio (*X*)	0.133	0.237		0.063	0.583			0.287		0.686	0.550	
Back of Queue (*Q*), ft/ln (95 th percentile)	14.1	128.1		18.5	390.6			64.5		185.2	128.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	5.0		0.7	15.5			2.6		7.3	5.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.11	0.00		0.29	0.00			0.00		0.95	0.00	
Uniform Delay (*d 1*), s/veh	8.8	9.3		12.5	17.9			54.4		55.8	54.9	
Incremental Delay (*d 2*), s/veh	0.1	0.2		0.3	0.9			0.4		1.7	1.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	8.9	9.4		12.7	18.8			54.8		57.4	56.0	
Level of Service (LOS)	A	A		B	B			D		E	E	
Approach Delay, s/veh / LOS	9.4	A		18.7	B		54.8	D		56.8	E	
Intersection Delay, s/veh / LOS	19.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.66	B	1.90	B	2.62	C	2.61	C
Bicycle LOS Score / LOS	0.93	A	1.39	A	0.56	A	0.85	A

EXHIBIT 4.14
2029 PEAK AM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Iroquois

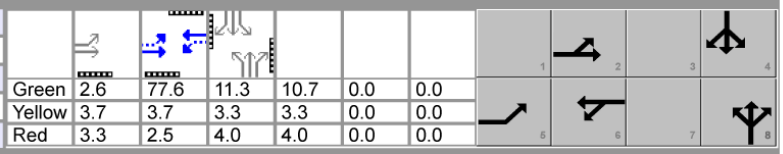
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2029_tot_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	19	1689		24	417		3	24	30	75	7	27

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	2.6	77.6	11.3	10.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	9.6	93.5		83.8		18.0		18.6
Change Period, ($Y+R_c$), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.3		3.2
Queue Clearance Time (g_s), s	2.4					6.8		8.0
Green Extension Time (g_e), s	0.0	0.0		0.0		0.1		0.2
Phase Call Probability	0.53					0.89		0.99
Max Out Probability	0.00					0.00		0.00

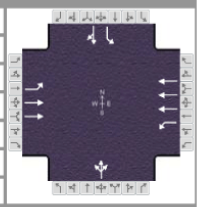
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	1836		26	453			62		82	37	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1700		257	1558			1579		1688	1454	
Queue Service Time (g_s), s	0.4	49.0		10.3	5.5			4.8		6.0	3.1	
Cycle Queue Clearance Time (g_c), s	0.4	49.0		49.7	5.5			4.8		6.0	3.1	
Green Ratio (*g/C*)	0.75	0.68		0.60	0.60			0.09		0.09	0.09	
Capacity (*c*), veh/h	780	2309		133	2827			142		159	137	
Volume-to-Capacity Ratio (*X*)	0.026	0.795		0.196	0.160			0.438		0.511	0.269	
Back of Queue (*Q*), ft/ln (95 th percentile)	5.4	625.8		34.3	89.6			87.8		117.9	53.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	24.8		1.4	3.4			3.5		4.6	2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00		0.53	0.00			0.00		0.60	0.00	
Uniform Delay (d_1), s/veh	4.2	14.8		35.3	11.2			56.1		56.0	54.7	
Incremental Delay (d_2), s/veh	0.0	2.9		3.3	0.1			0.8		0.9	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	4.2	17.8		38.5	11.4			56.9		57.0	55.1	
Level of Service (LOS)	A	B		D	B			E		E	E	
Approach Delay, s/veh / LOS	17.6	B		12.8	B		56.9	E		56.4	E	
Intersection Delay, s/veh / LOS	19.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.89	B	2.48	B	2.47	B
Bicycle LOS Score / LOS	2.02	B	0.75	A	0.59	A	0.68	A

EXHIBIT 4.15
2029 PEAK PM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Iroquois

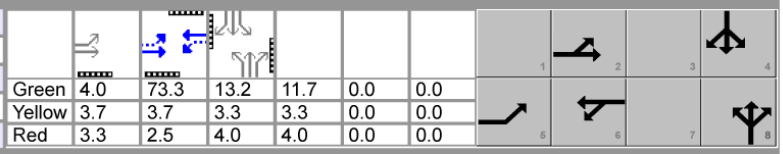
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	Carling/Iroquois	File Name	740_2029_tot_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	42	690		27	1490		13	20	10	117	23	60

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	4.0	73.3	13.2	11.7	0.0	0.0						
Yellow	3.7	3.7	3.3	3.3	0.0	0.0						
Red	3.3	2.5	4.0	4.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	1.0	4.0		6.3		12.0		10.0
Phase Duration, s	11.0	90.5		79.5		19.0		20.5
Change Period, ($Y+R_c$), s	7.0	6.2		6.2		7.3		7.3
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s	3.0					5.4		11.4
Green Extension Time (g_e), s	0.1	0.0		0.0		0.1		0.4
Phase Call Probability	0.81					0.82		1.00
Max Out Probability	0.00					0.00		0.00

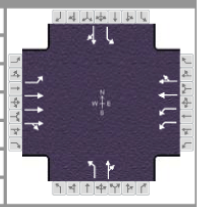
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	46	750		29	1620			47		127	90	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1687		720	1622			1662		1701	1506	
Queue Service Time (g_s), s	1.0	12.8		2.4	27.8			3.4		9.4	7.4	
Cycle Queue Clearance Time (g_c), s	1.0	12.8		4.2	27.8			3.4		9.4	7.4	
Green Ratio (*g/C*)	0.73	0.66		0.57	0.57			0.10		0.11	0.11	
Capacity (*c*), veh/h	343	2214		457	2779			163		185	164	
Volume-to-Capacity Ratio (*X*)	0.133	0.339		0.064	0.583			0.287		0.686	0.550	
Back of Queue (*Q*), ft/ln (95 th percentile)	14.1	206.4		19.2	390.6			64.5		185.2	128.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	8.1		0.8	15.5			2.6		7.3	5.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.11	0.00		0.30	0.00			0.00		0.95	0.00	
Uniform Delay (d_1), s/veh	8.8	10.1		13.3	17.9			54.4		55.8	54.9	
Incremental Delay (d_2), s/veh	0.1	0.4		0.3	0.9			0.4		1.7	1.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Control Delay (*d*), s/veh	8.9	10.5		13.5	18.8			54.8		57.4	56.0	
Level of Service (LOS)	A	B		B	B			D		E	E	
Approach Delay, s/veh / LOS	10.4	B		18.7	B		54.8	D		56.8	E	
Intersection Delay, s/veh / LOS	19.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.66	B	1.90	B	2.48	B	2.47	B
Bicycle LOS Score / LOS	1.14	A	1.39	A	0.56	A	0.85	A

EXHIBIT 4.16
2017 PEAK AM HOUR EXISTING TRAFFIC ANALYSIS - Carling/Maitland

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2017_ex_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	46	1446	263	319	272	17	131	103	421	70	327	16

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	4.4	2.8	55.1	33.2	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.7	3.7	3.7	3.3	0.0	0.0			
				Red	2.2	2.2	2.2	3.5	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	10.3	61.0	19.0	69.7		40.0		40.0
Change Period, (*Y*+*R c*), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (*g s*), s	5.3		14.0			36.2		36.2
Green Extension Time (*g e*), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.81		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

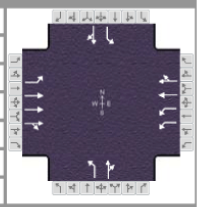
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	50	1272	585	347	158	156	142	570		76	373	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1772	1620	1613	1716	1670	1002	1489		835	1742	
Queue Service Time (*g s*), s	3.3	35.8	36.2	12.0	5.6	5.7	10.8	34.2		0.0	23.4	
Cycle Queue Clearance Time (*g c*), s	3.3	35.8	36.2	12.0	5.6	5.7	34.2	34.2		34.2	23.4	
Green Ratio (*g/C*)	0.09	0.47	0.47	0.76	0.54	0.54	0.29	0.29		0.29	0.29	
Capacity (*c*), veh/h	157	1657	757	538	927	902	150	424		60	496	
Volume-to-Capacity Ratio (*X*)	0.318	0.768	0.773	0.645	0.171	0.173	0.947	1.342		1.268	0.751	
Back of Queue (*Q*), ft/ln (95 th percentile)	65.2	552.4	533.7	221.6	105.2	99.2	279.4	1255.3		240.5	408.3	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.5	21.7	21.3	8.6	4.0	4.0	10.9	48.7		9.4	15.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.40	0.00	0.00	0.48	0.00	0.00	0.86	0.00		0.98	0.00	
Uniform Delay (*d 1*), s/veh	50.8	26.9	26.6	46.7	14.2	14.0	56.6	42.9		60.0	39.0	
Incremental Delay (*d 2*), s/veh	0.4	3.5	7.5	2.1	0.4	0.4	56.9	169.0		204.4	5.6	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	51.2	30.4	34.2	48.8	14.6	14.4	113.4	211.9		264.4	44.7	
Level of Service (LOS)	D	C	C	D	B	B	F	F		F	D	
Approach Delay, s/veh / LOS	32.1	C		32.5	C		192.2	F		81.9	F	
Intersection Delay, s/veh / LOS	68.7						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.10	B	1.90	B	2.59	C	2.45	B
Bicycle LOS Score / LOS	1.54	B	1.03	A	1.66	B	1.23	A

EXHIBIT 4.17
2017 PEAK PM HOUR EXISTING TRAFFIC ANALYSIS - Carling/Maitland

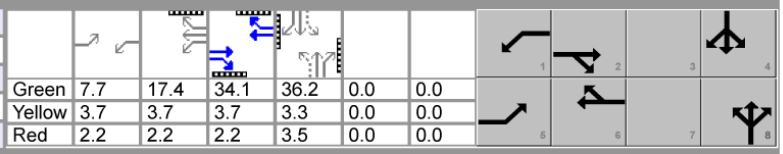
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2017_ex_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	86	559	170	769	1309	56	212	221	221	50	208	45

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.7	17.4	34.1	36.2	0.0	0.0						
Yellow	3.7	3.7	3.7	3.3	0.0	0.0						
Red	2.2	2.2	2.2	3.5	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	13.6	40.0	37.0	63.4		43.0		43.0
Change Period, ($Y+R_c$), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (g_s), s	8.1		29.8			39.2		39.2
Green Extension Time (g_e), s	0.0	0.0	1.3	0.0		0.0		0.0
Phase Call Probability	0.96		1.00			1.00		1.00
Max Out Probability	1.00		0.38			1.00		1.00

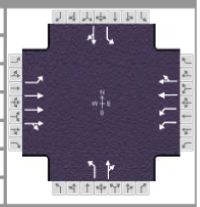
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	93	549	244	836	747	736	230	480		54	275	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1772	1527	1652	1786	1749	1112	1601		929	1725	
Queue Service Time (g_s), s	6.1	15.6	16.1	27.8	44.3	44.7	21.5	35.5		1.7	15.7	
Cycle Queue Clearance Time (g_c), s	6.1	15.6	16.1	27.8	44.3	44.7	37.2	35.5		37.2	15.7	
Green Ratio (*g/C*)	0.12	0.29	0.29	0.32	0.49	0.49	0.31	0.31		0.31	0.31	
Capacity (*c*), veh/h	209	1037	447	1045	870	852	259	496		73	535	
Volume-to-Capacity Ratio (*X*)	0.447	0.529	0.545	0.800	0.859	0.864	0.889	0.968		0.744	0.514	
Back of Queue (*Q*), ft/ln (95 th percentile)	117.8	285.5	267.4	429.6	706.1	697.2	350.5	636.2		101.3	271.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	4.7	11.2	10.7	17.0	28.0	27.9	13.9	25.0		4.1	10.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.71	0.00	0.00	0.93	0.00	0.00	0.82	0.00		0.41	0.00	
Uniform Delay (d_1), s/veh	48.9	35.9	35.7	37.5	27.5	27.2	50.7	40.8		59.8	34.0	
Incremental Delay (d_2), s/veh	0.6	1.9	4.7	3.3	10.8	11.3	28.2	32.1		30.0	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	49.5	37.8	40.4	40.8	38.3	38.5	78.9	72.9		89.8	34.4	
Level of Service (LOS)	D	D	D	D	D	D	E	E		F	C	
Approach Delay, s/veh / LOS	39.8	D		39.3	D		74.9	E		43.5	D	
Intersection Delay, s/veh / LOS	45.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	1.91	B	2.59	C	2.45	B
Bicycle LOS Score / LOS	0.97	A	2.40	B	1.66	B	1.03	A

EXHIBIT 4.18
2024 PEAK AM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Maitland

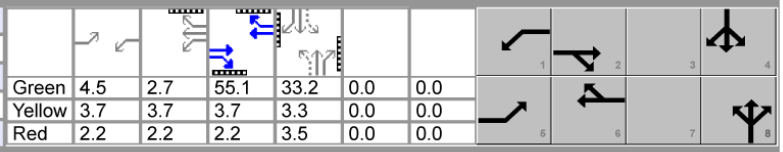
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Jan 3, 2022	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2024_bak_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	47	1487	275	319	289	17	142	103	421	70	327	16

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	4.5	2.7	55.1	33.2	0.0	0.0						
Yellow	3.7	3.7	3.7	3.3	0.0	0.0						
Red	2.2	2.2	2.2	3.5	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	10.4	61.0	19.0	69.6		40.0		40.0
Change Period, (*Y*+*R c*), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (*g s*), s	5.4		14.0			36.2		36.2
Green Extension Time (*g e*), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.82		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

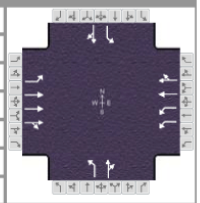
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	51	1311	604	347	168	165	154	570		76	373	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1772	1618	1613	1716	1672	1002	1489		835	1742	
Queue Service Time (*g s*), s	3.4	37.5	38.0	12.0	6.0	6.1	10.8	34.2		0.0	23.4	
Cycle Queue Clearance Time (*g c*), s	3.4	37.5	38.0	12.0	6.0	6.1	34.2	34.2		34.2	23.4	
Green Ratio (*g/C*)	0.09	0.47	0.47	0.76	0.54	0.54	0.29	0.29		0.29	0.29	
Capacity (*c*), veh/h	158	1657	756	538	926	902	150	424		60	496	
Volume-to-Capacity Ratio (*X*)	0.322	0.792	0.798	0.645	0.181	0.183	1.026	1.342		1.268	0.751	
Back of Queue (*Q*), ft/ln (95 th percentile)	66.6	577.2	560.9	221.6	112.3	105.9	325	1255.3		240.5	408.3	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.6	22.7	22.4	8.6	4.3	4.2	12.7	48.7		9.4	15.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.40	0.00	0.00	0.48	0.00	0.00	1.00	0.00		0.98	0.00	
Uniform Delay (*d 1*), s/veh	50.7	27.4	27.1	46.7	14.3	14.1	56.7	42.9		60.0	39.0	
Incremental Delay (*d 2*), s/veh	0.4	4.0	8.6	2.1	0.4	0.4	80.5	169.0		204.4	5.6	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	51.2	31.3	35.7	48.8	14.8	14.6	137.2	211.9		264.4	44.7	
Level of Service (LOS)	D	C	D	D	B	B	F	F		F	D	
Approach Delay, s/veh / LOS	33.2	C		32.1	C		195.9	F		81.9	F	
Intersection Delay, s/veh / LOS	69.6						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.10	B	1.90	B	2.59	C	2.45	B
Bicycle LOS Score / LOS	1.57	B	1.05	A	1.68	B	1.23	A

EXHIBIT 4.19
2024 PEAK PM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Maitland

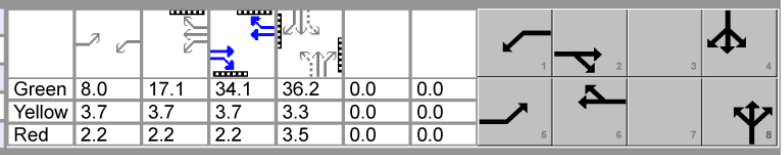
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Background	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2024_bak_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	90	579	177	769	1338	56	242	221	221	50	208	45

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	8.0	17.1	34.1	36.2	0.0	0.0
Yellow	3.7	3.7	3.7	3.3	0.0	0.0
Red	2.2	2.2	2.2	3.5	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	13.9	40.0	37.0	63.1		43.0		43.0
Change Period, ($Y+R_c$), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (g_s), s	8.4		29.8			39.2		39.2
Green Extension Time (g_e), s	0.0	0.0	1.3	0.0		0.0		0.0
Phase Call Probability	0.96		1.00			1.00		1.00
Max Out Probability	1.00		0.38			1.00		1.00

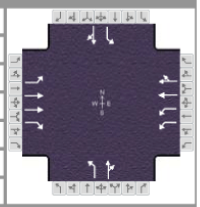
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	98	570	252	836	763	752	263	480		54	275	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1772	1526	1652	1786	1750	1112	1601		929	1725	
Queue Service Time (g_s), s	6.4	16.3	16.8	27.8	46.1	46.6	21.5	35.5		1.7	15.7	
Cycle Queue Clearance Time (g_c), s	6.4	16.3	16.8	27.8	46.1	46.6	37.2	35.5		37.2	15.7	
Green Ratio (*g/C*)	0.12	0.29	0.29	0.32	0.48	0.48	0.31	0.31		0.31	0.31	
Capacity (*c*), veh/h	214	1037	447	1045	866	848	259	496		73	535	
Volume-to-Capacity Ratio (*X*)	0.458	0.549	0.564	0.800	0.881	0.887	1.015	0.968		0.744	0.514	
Back of Queue (*Q*), ft/ln (95 th percentile)	123.2	296.3	277.1	429.6	741.3	733.3	453.5	636.2		101.3	271.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	4.9	11.7	11.1	17.0	29.4	29.3	18.0	25.0		4.1	10.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.75	0.00	0.00	0.93	0.00	0.00	1.07	0.00		0.41	0.00	
Uniform Delay (d_1), s/veh	48.8	36.1	35.9	37.5	28.2	28.0	51.7	40.8		59.8	34.0	
Incremental Delay (d_2), s/veh	0.6	2.1	5.1	3.3	12.5	13.2	59.7	32.1		30.0	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	49.3	38.2	41.0	40.8	40.8	41.2	111.4	72.9		89.8	34.4	
Level of Service (LOS)	D	D	D	D	D	D	F	E		F	C	
Approach Delay, s/veh / LOS	40.2	D		40.9	D		86.5	F		43.5	D	
Intersection Delay, s/veh / LOS	48.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	1.91	B	2.59	C	2.45	B
Bicycle LOS Score / LOS	0.99	A	2.43	B	1.71	B	1.03	A

EXHIBIT 4.20
2029 PEAK AM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Maitland

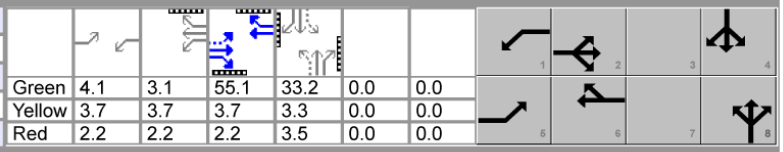
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Jan 3, 2022	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2029_bak_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	47	1487	275	319	289	17	142	103	421	70	327	16

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	4.1	3.1	55.1	33.2	0.0	0.0						
Yellow	3.7	3.7	3.7	3.3	0.0	0.0						
Red	2.2	2.2	2.2	3.5	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	2.0	4.0		6.0		6.0
Phase Duration, s	10.0	61.0	19.0	70.0		40.0		40.0
Change Period, (*Y*+*R c*), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (*g s*), s	3.5		14.0			36.2		36.2
Green Extension Time (*g e*), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.82		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

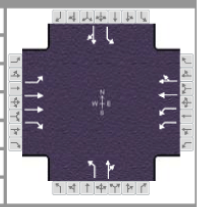
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	51	1616	299	347	168	165	154	570		76	373	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1687	1510	1613	1716	1672	1002	1489		835	1742	
Queue Service Time (*g s*), s	1.5	56.1	15.8	12.0	5.9	6.0	10.8	34.2		0.0	23.4	
Cycle Queue Clearance Time (*g c*), s	1.5	56.1	15.8	12.0	5.9	6.0	34.2	34.2		34.2	23.4	
Green Ratio (*g/C*)	0.61	0.47	0.47	0.17	0.54	0.54	0.29	0.29		0.29	0.29	
Capacity (*c*), veh/h	690	1577	706	538	931	907	150	424		60	496	
Volume-to-Capacity Ratio (*X*)	0.074	1.025	0.424	0.645	0.180	0.182	1.026	1.342		1.268	0.751	
Back of Queue (*Q*), ft/ln (95 th percentile)	24.2	951.4	244.4	221.6	111.4	104.9	325	1255.3		240.5	408.3	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.9	37.5	9.8	8.6	4.3	4.2	12.7	48.7		9.4	15.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.15	0.00	0.00	0.48	0.00	0.00	1.00	0.00		0.98	0.00	
Uniform Delay (*d 1*), s/veh	9.7	32.0	21.2	46.7	14.1	13.9	56.7	42.9		60.0	39.0	
Incremental Delay (*d 2*), s/veh	0.0	29.2	1.9	2.1	0.4	0.4	80.5	169.0		204.4	5.6	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.7	61.1	23.1	48.8	14.6	14.4	137.2	211.9		264.4	44.7	
Level of Service (LOS)	A	F	C	D	B	B	F	F		F	D	
Approach Delay, s/veh / LOS	54.0	D		32.0	C		195.9	F		81.9	F	
Intersection Delay, s/veh / LOS	80.3						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.10	B	1.90	B	2.45	B	2.45	B
Bicycle LOS Score / LOS	2.11	B	1.05	A	1.68	B	1.23	A

EXHIBIT 4.21
2029 PEAK PM HOUR BACKGROUND TRAFFIC ANALYSIS - Carling/Maitland

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Background	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2029_bak_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	90	579	177	769	1338	56	242	221	221	50	208	45

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.8	19.4	34.1	36.2	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.7	3.7	3.7	3.3	0.0	0.0			
				Red	2.2	2.2	2.2	3.5	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	2.0	4.0		6.0		6.0
Phase Duration, s	11.7	40.0	37.0	65.3		43.0		43.0
Change Period, (*Y*+*R c*), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (*g s*), s	6.0		29.8			39.2		39.2
Green Extension Time (*g e*), s	0.0	0.0	1.3	0.0		0.0		0.0
Phase Call Probability	0.96		1.00			1.00		1.00
Max Out Probability	1.00		0.38			1.00		1.00

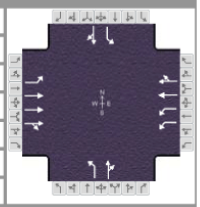
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	98	629	192	836	763	752	263	480		54	275	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1687	1486	1652	1786	1750	1112	1601		929	1725	
Queue Service Time (*g s*), s	4.0	19.5	12.6	27.8	44.5	44.9	21.5	35.5		1.7	15.7	
Cycle Queue Clearance Time (*g c*), s	4.0	19.5	12.6	27.8	44.5	44.9	37.2	35.5		37.2	15.7	
Green Ratio (*g/C*)	0.45	0.29	0.29	0.32	0.50	0.50	0.31	0.31		0.31	0.31	
Capacity (*c*), veh/h	278	988	435	1045	899	881	259	496		73	535	
Volume-to-Capacity Ratio (*X*)	0.352	0.637	0.442	0.800	0.849	0.854	1.015	0.968		0.744	0.514	
Back of Queue (*Q*), ft/ln (95 th percentile)	72.1	332.5	213.7	429.6	700.2	692	453.5	636.2		101.3	271.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	13.1	8.5	17.0	27.8	27.7	18.0	25.0		4.1	10.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.44	0.00	0.00	0.93	0.00	0.00	1.07	0.00		0.41	0.00	
Uniform Delay (*d 1*), s/veh	24.1	37.3	34.5	37.5	26.2	26.0	51.7	40.8		59.8	34.0	
Incremental Delay (*d 2*), s/veh	0.3	3.1	3.2	3.3	9.8	10.3	59.7	32.1		30.0	0.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	24.4	40.4	37.7	40.8	36.1	36.3	111.4	72.9		89.8	34.4	
Level of Service (LOS)	C	D	D	D	D	D	F	E		F	C	
Approach Delay, s/veh / LOS	38.2	D		37.8	D		86.5	F		43.5	D	
Intersection Delay, s/veh / LOS	46.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	1.91	B	2.45	B	2.45	B
Bicycle LOS Score / LOS	1.25	A	2.43	B	1.71	B	1.03	A

EXHIBIT 4.22
2024 PEAK AM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Maitland

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Jan 3, 2022	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2024_tot_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	48	1490	276	319	290	17	142	103	421	70	327	16

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	4.1	3.1	55.1	33.2	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.7	3.7	3.7	3.3	0.0	0.0			
				Red	2.2	2.2	2.2	3.5	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	10.0	61.0	19.0	70.0		40.0		40.0
Change Period, (*Y*+*R c*), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (*g s*), s	3.5		14.0			36.2		36.2
Green Extension Time (*g e*), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.82		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

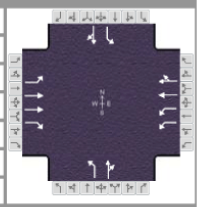
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	52	1314	605	347	168	166	154	570		76	373	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1772	1618	1613	1716	1672	1002	1489		835	1742	
Queue Service Time (*g s*), s	1.5	37.7	38.2	12.0	6.0	6.0	10.8	34.2		0.0	23.4	
Cycle Queue Clearance Time (*g c*), s	1.5	37.7	38.2	12.0	6.0	6.0	34.2	34.2		34.2	23.4	
Green Ratio (*g/C*)	0.61	0.47	0.47	0.17	0.54	0.54	0.29	0.29		0.29	0.29	
Capacity (*c*), veh/h	690	1657	756	538	930	907	150	424		60	496	
Volume-to-Capacity Ratio (*X*)	0.076	0.793	0.800	0.645	0.181	0.183	1.026	1.342		1.268	0.751	
Back of Queue (*Q*), ft/ln (95 th percentile)	24.7	579.1	563.5	221.6	112	105.6	325	1255.3		240.5	408.3	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.0	22.8	22.5	8.6	4.3	4.2	12.7	48.7		9.4	15.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.15	0.00	0.00	0.48	0.00	0.00	1.00	0.00		0.98	0.00	
Uniform Delay (*d 1*), s/veh	9.7	27.4	27.2	46.7	14.2	14.0	56.7	42.9		60.0	39.0	
Incremental Delay (*d 2*), s/veh	0.0	4.0	8.7	2.1	0.4	0.4	80.5	169.0		204.4	5.6	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.7	31.4	35.9	48.8	14.6	14.4	137.2	211.9		264.4	44.7	
Level of Service (LOS)	A	C	D	D	B	B	F	F		F	D	
Approach Delay, s/veh / LOS	32.2	C		32.0	C		195.9	F		81.9	F	
Intersection Delay, s/veh / LOS	69.0						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.10	B	1.90	B	2.59	C	2.45	B
Bicycle LOS Score / LOS	1.57	B	1.05	A	1.68	B	1.23	A

EXHIBIT 4.23
2024 PEAK PM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Maitland

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2024 Total	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2024_tot_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	90	579	177	769	1338	56	242	221	221	50	208	45

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.8	19.4	34.1	36.2	0.0	0.0	
Yellow	3.7	3.7	3.7	3.3	0.0	0.0	
Red	2.2	2.2	2.2	3.5	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	2.0	4.0		6.0		6.0
Phase Duration, s	11.7	40.0	37.0	65.3		43.0		43.0
Change Period, (*Y*+*R c*), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (*g s*), s	6.0		29.8			39.2		39.2
Green Extension Time (*g e*), s	0.0	0.0	1.3	0.0		0.0		0.0
Phase Call Probability	0.96		1.00			1.00		1.00
Max Out Probability	1.00		0.38			1.00		1.00

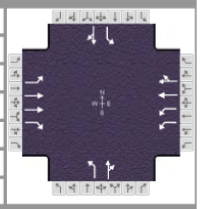
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	98	629	192	836	763	752	263	480		54	275	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1687	1486	1652	1786	1750	1112	1601		929	1725	
Queue Service Time (*g s*), s	4.0	19.5	12.6	27.8	44.5	44.9	21.5	35.5		1.7	15.7	
Cycle Queue Clearance Time (*g c*), s	4.0	19.5	12.6	27.8	44.5	44.9	37.2	35.5		37.2	15.7	
Green Ratio (*g/C*)	0.45	0.29	0.29	0.32	0.50	0.50	0.31	0.31		0.31	0.31	
Capacity (*c*), veh/h	278	988	435	1045	899	881	259	496		73	535	
Volume-to-Capacity Ratio (*X*)	0.352	0.637	0.442	0.800	0.849	0.854	1.015	0.968		0.744	0.514	
Back of Queue (*Q*), ft/ln (95 th percentile)	72.1	332.5	213.7	429.6	700.2	692	453.5	636.2		101.3	271.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	13.1	8.5	17.0	27.8	27.7	18.0	25.0		4.1	10.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.44	0.00	0.00	0.93	0.00	0.00	1.07	0.00		0.41	0.00	
Uniform Delay (*d 1*), s/veh	24.1	37.3	34.5	37.5	26.2	26.0	51.7	40.8		59.8	34.0	
Incremental Delay (*d 2*), s/veh	0.3	3.1	3.2	3.3	9.8	10.3	59.7	32.1		30.0	0.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	24.4	40.4	37.7	40.8	36.1	36.3	111.4	72.9		89.8	34.4	
Level of Service (LOS)	C	D	D	D	D	D	F	E		F	C	
Approach Delay, s/veh / LOS	38.2	D		37.8	D		86.5	F		43.5	D	
Intersection Delay, s/veh / LOS	46.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	1.91	B	2.45	B	2.45	B
Bicycle LOS Score / LOS	1.25	A	2.43	B	1.71	B	1.03	A

EXHIBIT 4.24
2029 PEAK AM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Maitland

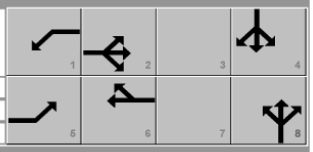
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	Jan 3, 2022	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak AM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2029_tot_am.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	48	1490	276	319	290	17	142	103	421	70	327	16

Signal Information					EB			WB			NB			SB		
Cycle, s	120.0	Reference Phase	2		L	T	R	L	T	R	L	T	R	L	T	R
Offset, s	0	Reference Point	End	Green	4.1	3.1		55.1	33.2	0.0	0.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.7	3.7		3.7	3.3	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.2	2.2		2.2	3.5	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	2.0	4.0		6.0		6.0
Phase Duration, s	10.0	61.0	19.0	70.0		40.0		40.0
Change Period, ($Y+R_c$), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (g_s), s	3.5		14.0			36.2		36.2
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.82		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

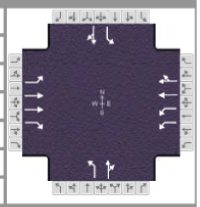
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	52	1620	300	347	168	166	154	570		76	373	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1687	1510	1613	1716	1672	1002	1489		835	1742	
Queue Service Time (g_s), s	1.5	56.1	15.8	12.0	6.0	6.0	10.8	34.2		0.0	23.4	
Cycle Queue Clearance Time (g_c), s	1.5	56.1	15.8	12.0	6.0	6.0	34.2	34.2		34.2	23.4	
Green Ratio (*g/C*)	0.61	0.47	0.47	0.17	0.54	0.54	0.29	0.29		0.29	0.29	
Capacity (*c*), veh/h	690	1577	706	538	930	907	150	424		60	496	
Volume-to-Capacity Ratio (*X*)	0.076	1.027	0.425	0.645	0.181	0.183	1.026	1.342		1.268	0.751	
Back of Queue (*Q*), ft/ln (95 th percentile)	24.7	956.9	245.1	221.6	112	105.6	325	1255.3		240.5	408.3	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.0	37.7	9.8	8.6	4.3	4.2	12.7	48.7		9.4	15.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.15	0.00	0.00	0.48	0.00	0.00	1.00	0.00		0.98	0.00	
Uniform Delay (d_1), s/veh	9.7	32.0	21.2	46.7	14.2	14.0	56.7	42.9		60.0	39.0	
Incremental Delay (d_2), s/veh	0.0	29.8	1.9	2.1	0.4	0.4	80.5	169.0		204.4	5.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.7	61.7	23.1	48.8	14.6	14.4	137.2	211.9		264.4	44.7	
Level of Service (LOS)	A	F	C	D	B	B	F	F		F	D	
Approach Delay, s/veh / LOS	54.5	D		32.0	C		195.9	F		81.9	F	
Intersection Delay, s/veh / LOS	80.5						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.10	B	1.90	B	2.45	B	2.45	B
Bicycle LOS Score / LOS	2.11	B	1.05	A	1.68	B	1.23	A

EXHIBIT 4.25
2029 PEAK PM HOUR TOTAL TRAFFIC ANALYSIS - Carling/Maitland

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.250
Analyst		Analysis Date	12/31/2021	Area Type	Other
Jurisdiction	City of Ottawa	Time Period	Peak PM Hour	PHF	0.92
Urban Street	Carling Avenue	Analysis Year	2029 Total	Analysis Period	1> 7:00
Intersection	Carling/Maitland	File Name	740_2029_tot_pm.xus		
Project Description	Carling Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	91	581	177	769	1341	56	243	221	221	50	208	45

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.9	19.3	34.1	36.2	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.7	3.7	3.7	3.3	0.0	0.0			
				Red	2.2	2.2	2.2	3.5	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	2.0	4.0		6.0		6.0
Phase Duration, s	11.8	40.0	37.0	65.2		43.0		43.0
Change Period, (*Y*+*R c*), s	5.9	5.9	5.9	5.9		6.8		6.8
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.4
Queue Clearance Time (*g s*), s	6.1		29.8			39.2		39.2
Green Extension Time (*g e*), s	0.0	0.0	1.3	0.0		0.0		0.0
Phase Call Probability	0.96		1.00			1.00		1.00
Max Out Probability	1.00		0.38			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	99	632	192	836	764	754	264	480		54	275	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1714	1687	1486	1652	1786	1751	1112	1601		929	1725	
Queue Service Time (*g s*), s	4.1	19.5	12.6	27.8	44.7	45.1	21.5	35.5		1.7	15.7	
Cycle Queue Clearance Time (*g c*), s	4.1	19.5	12.6	27.8	44.7	45.1	37.2	35.5		37.2	15.7	
Green Ratio (*g/C*)	0.45	0.29	0.29	0.32	0.50	0.50	0.31	0.31		0.31	0.31	
Capacity (*c*), veh/h	278	988	435	1045	898	880	259	496		73	535	
Volume-to-Capacity Ratio (*X*)	0.356	0.639	0.442	0.800	0.851	0.857	1.019	0.968		0.744	0.514	
Back of Queue (*Q*), ft/ln (95 th percentile)	73	333.5	213.7	429.6	703.1	695	457.2	636.2		101.3	271.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	13.1	8.5	17.0	27.9	27.8	18.1	25.0		4.1	10.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.44	0.00	0.00	0.93	0.00	0.00	1.08	0.00		0.41	0.00	
Uniform Delay (*d 1*), s/veh	24.2	37.3	34.5	37.5	26.3	26.1	51.7	40.8		59.8	34.0	
Incremental Delay (*d 2*), s/veh	0.3	3.2	3.2	3.3	10.0	10.5	60.8	32.1		30.0	0.4	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	24.5	40.5	37.7	40.8	36.3	36.6	112.5	72.9		89.8	34.4	
Level of Service (LOS)	C	D	D	D	D	D	F	E		F	C	
Approach Delay, s/veh / LOS	38.2	D		38.0	D		87.0	F		43.5	D	
Intersection Delay, s/veh / LOS	46.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	1.91	B	2.45	B	2.45	B
Bicycle LOS Score / LOS	1.25	A	2.43	B	1.72	B	1.03	A

EXHIBIT 4.26
2029 MMLOS INTERSECTIONS - Iroquois/Carling and Maitland/Carling

Multi-Modal Level of Service - Intersections Form

Consultant		Project	Carling Apt.
Scenario	Total 2029 Traffic	Date	Jan-22
Comments	Carling Intersections		

INTERSECTIONS		Carling Avenue and Iroquois Road						Carling Avenue and Maitland Avenue					
	Crossing Side	NORTH	SOUTH	EAST	WEST			NORTH	SOUTH	EAST	WEST		
Pedestrian	Lanes	3	3	7	8			3	4	6	6		
	Median	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m			No Median - 2.4 m	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m		
	Conflicting Left Turns	Permissive	Permissive	Permissive	Protected/ Permissive			Permissive	Permissive	Protected/ Permissive	Protected/ Permissive		
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control			Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR allowed			RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		
	Ped Signal Leading Interval?	No	No	No	No			No	No	No	No		
	Right Turn Channel	No Channel	No Channel	No Right Turn	Conv'l without Receiving Lane			No Channel	No Channel	No Channel	No Channel		
	Corner Radius	10-15m	10-15m	No Right Turn	10-15m			10-15m	10-15m	10-15m	10-15m		
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings			Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings		
	PETSI Score	70	70	28	-1			70	56	28	28		
	Ped. Exposure to Traffic LoS	C	C	F	F			C	D	F	F		
	Cycle Length	130	130	130	130			120	120	120	120		
	Effective Walk Time	10	10	10	10			10	10	10	10		
	Average Pedestrian Delay	55	55	55	65			50	50	50	50		
	Pedestrian Delay LoS	E	E	E	E			E	E	E	E		
	Level of Service	E	E	F	F			E	E	F	F		
		F						F					
	Approach From	NORTH	SOUTH	EAST	WEST			NORTH	SOUTH	EAST	WEST		
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP			Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	Not Applicable	Not Applicable			≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m		
	Right Turning Speed	>25 km/h	>25 km/h	Not Applicable	Not Applicable			>25 km/h	>25 km/h	>25 km/h	>25 km/h		
	Cyclist relative to RT motorists	E	E	Not Applicable	Not Applicable			E	E	E	E		
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Separated	Separated			Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		
	Left Turn Approach	One lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed			No lane crossed	One lane crossed	≥ 2 lanes crossed	One lane crossed		
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h			> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		
	Left Turning Cyclist	D	B	F	F			B	D	F	E		
	Level of Service	E	E	F	F			E	E	F	E		
		F						F					
Transit	Average Signal Delay	> 40 sec	> 40 sec	≤ 20 sec	≤ 20 sec			> 40 sec	> 40 sec	≤ 40 sec	≤ 40 sec		
	Level of Service	F	F	C	C			F	F	E	E		
		F						F					
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	> 15 m	10 - 15 m			10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m		
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2			1	≥ 2	≥ 2	≥ 2		
	Level of Service	E	E	A	B			E	B	B	B		
		E						E					
Auto	Volume to Capacity Ratio	0.0 - 0.60						0.61 - 0.70					
	Level of Service	A						B					